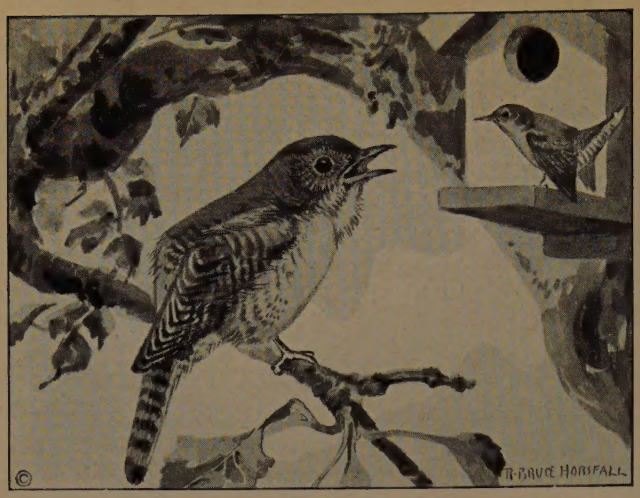
NATURE MAGAZINE

MARCH 1933 35¢ VOL. 21, NO. 3



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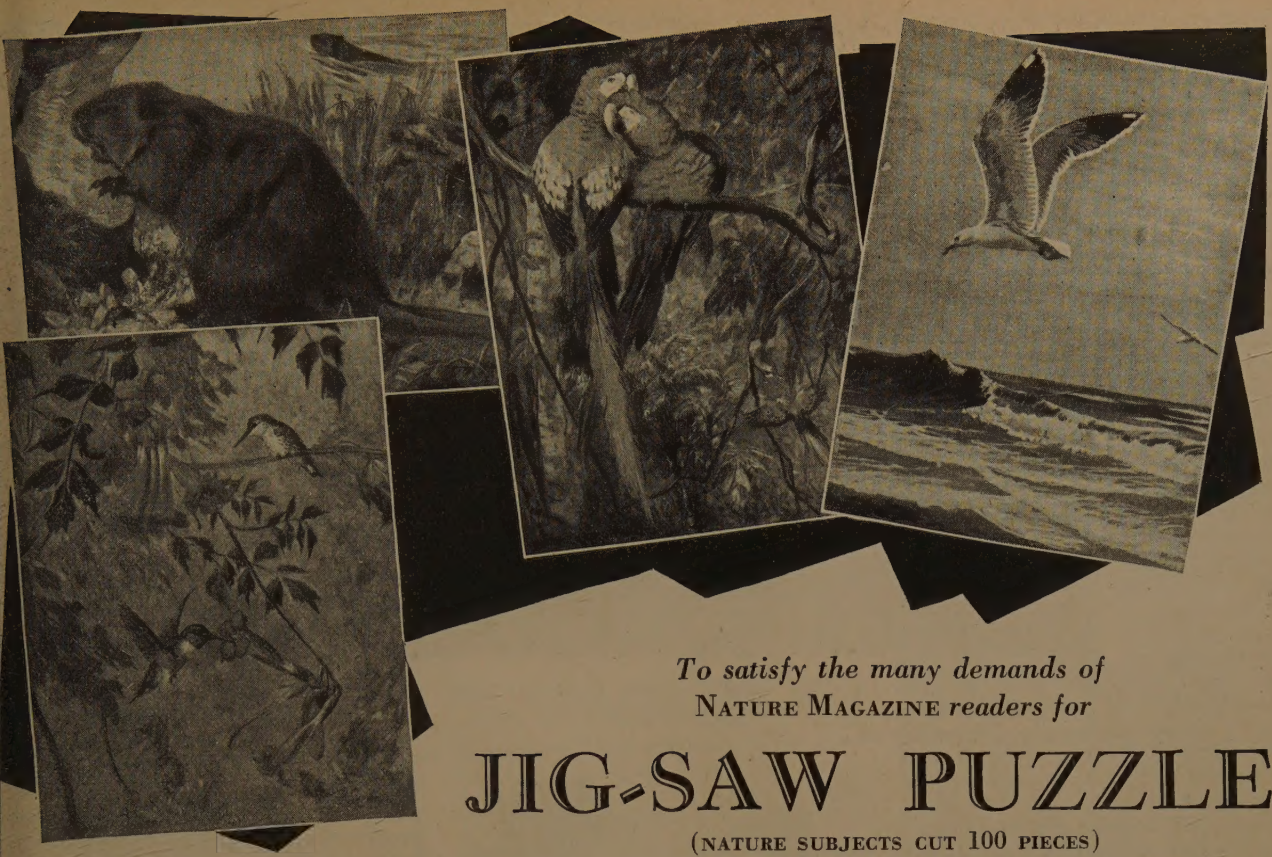

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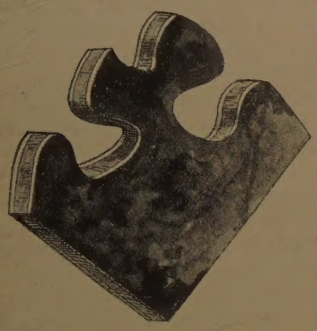

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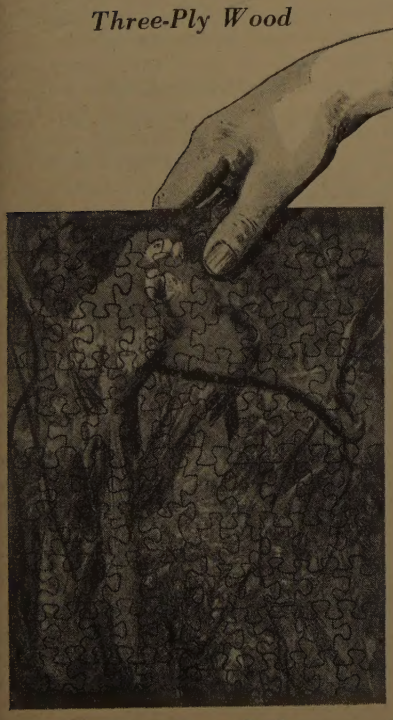

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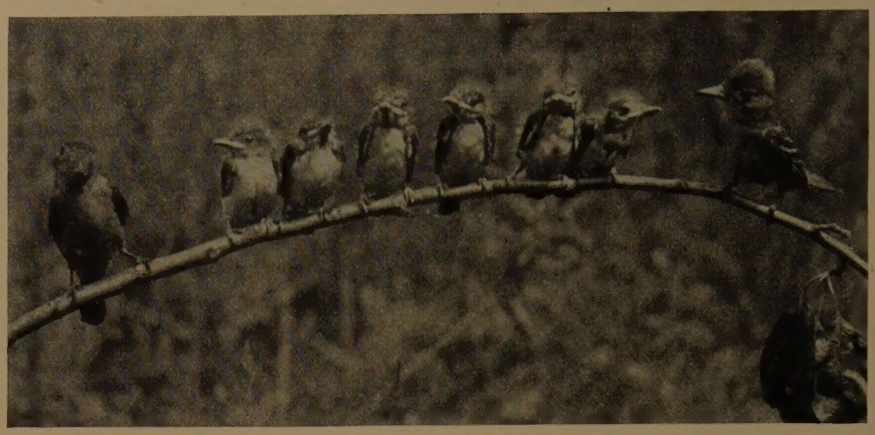
HUNTERS WHO DO NOT KILL

By Howard Taylor Middleton

From the cool deep heart of the Jersey barrens, down many twisting miles to the historic Delaware, flows the crookedest, the brownest, and the sweetest little stream in all the world, the cedar-stained Rancocas.

Along its brimming banks through woodland, field and swampy meadow, abound the sort of game I "shoot" in largest variety of breed and color. From the great blue heron, whose mighty pinions demand six feet or more of space in which to beat their measured strokes above the marsh grass, to that feathered jewel, Ruby-throat, the humming bird, whose diminutive wing-spread may be measured by a finger, they all are there to challenge the art and patience of the Nature-camera folk.



A RARE CAMERA PRIZE WITH ALL THE FLYCATCHERS POSING

It was some years ago that we first met our friends the flycatchers. In a gnarled old apple tree that marked the exact centre of the orchard, at the base of a sawed-off limb, Pal and I watched the two beauties in olive and sulphur-yellow at their housekeeping, and later photographed them. First of all, we posed the three babies from the nest upon an apple spray and then, with string to camera shutter, waited at a distance for the parents to come with food for their young. After what seemed an interminable time, we were forced to concoct some other scheme because the old birds concentrated all their energy upon a fourth and delicate fledgling inside the nesting hole. After a full hour of suspense, we decided that if a diet of insects would make him sturdy, that puny infant would become a feathered Hercules.

POSTED AGAINST THE GUNNER BUT NOT AGAINST THE CAMERA

It was now that Pal solved the problem by picking up the hatchet and driving its keen blade through the bottom of the flycatchers' doorway so as to both close the entrance and form a studio in which to pose our subjects. Then the youngsters were transferred from the apple spray to the hatchet handle.

Almost immediately one of the old birds flew to the barred door and fluttered there in a vain effort to gain admittance. Finding this impossible, and lured by hungry cheeping from above, the fond parent settled upon the extreme end of the handle. With graceful back to the camera lens, head turned in profile, and a fat grub in beak, the pose was superb, and it was to the accompaniment of a real thrill that the string was pulled and the picture taken.

Next year there were six fully feathered little flycatchers at home when we called upon a beautiful July morning. Knotting a large handkerchief into a cradle, Pal placed the babies inside for temporary safe keeping while we arranged our studio on an apple spray. When the camera was erected upon its tripod and focused with greatest care, a string was attached to shutter lever, after which the subjects were placed in position. They showed signs of extreme nervousness at first, making short but rapid flights into the high grass. However, before our patience and endurance were quite exhausted, the young birds grew tired, too, and remained quietly at rest. Then Father came to the apple spray with food, delivered it and promptly flew away for more while Mother watched the proceedings from an overhead bough. Daddy came winging back again, alighting to the left of his children. Mother quickly followed, taking her position at the right. By a sweating hand that trembled, the string was pulled, and a wonder picture came to us through the friendship of the flycatchers.

In closing, let us change from birds to mammals for just long enough to discuss with brevity the interesting subject of gun versus camera in the hunting of furred game.

The strongest argument against camera hunting, as set forth by staunch supporters of the gun, is the difficulty in getting near enough to the quarry for worthwhile portraiture. My answer to this is that the princely sport of animal photography does demand a generous toll of work, time, and patience; hence, its fascination. No victory in the world of sport that comes easily brings with it half the glory that is derived from an achievement in which hard labor of both mind and body is involved. A boy of ten can shoot a rabbit with a gun, and do it handily. However, it takes strategy and perseverance far beyond his years to bring such game to successful bag with a camera.

Fortunately the element which invariably favors the camera hunter in greater measure than the gunner is luck. This is because when the lucky chance arrives, no matter what the subject may be, the man behind the lens can take advantage of it, while the man behind the firearm is often brought

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A FINER MEMORY OF A RABBIT FAMILY THAN A KILLER HAS

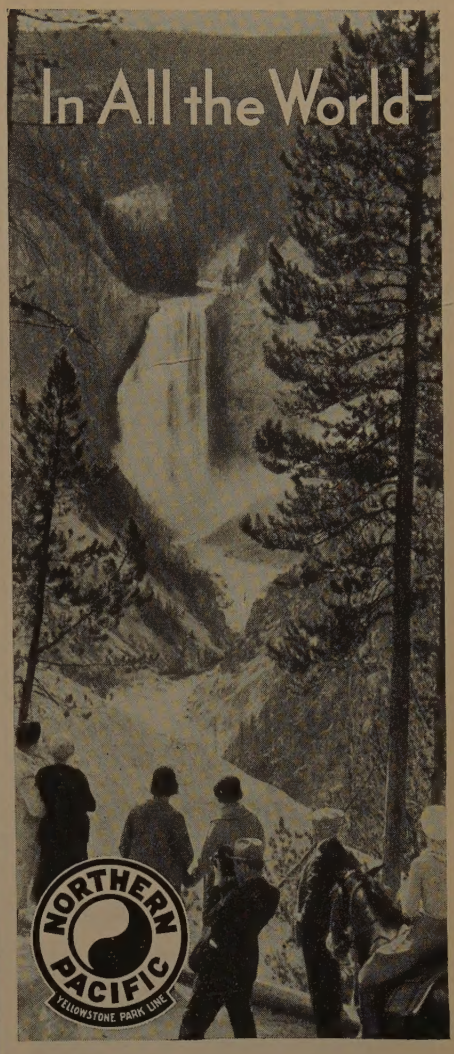
furry babies are at their nursery gambols, past the frosty hunting moon, and on to the moon of bitter cold when wapiti overcoats are snugly lined against the blasts—all these times are camera time for the hunters who do not kill.

A View of Art

In a few surprisingly delightful moments one is impressed with the adequate manner in which "Art and Nature Appreciation", by George H. Opdyke, fills a very real need in the chaotic state of the art world of today. For the bewildered layman or the beginner in the study of the visual arts and esthetics it provides a background readily understandable and convincingly supported by the best thought of our time and centuries past; for the mature artist who perhaps may be perplexed by the incessant clamor of the current "isms" it is an urge to evaluate. Lucid, concise and skillfully arranged, it presents the accumulated wealth of the author's broad cultural researches, each chapter appropriately supplemented by carefully selected passages from the writings of great artists and critics of the present and past. And not only is there this able discussion of the universal principles of the visual arts, but they are made to apply to the problems of all who would have the arts and esthetics influence the life about them. It is published at $3.50 by the Macmillan Company.

What's Outdoors

Convinced that many young people, their interest in Nature and the outdoors stimulated by school courses, need a friendly guide to their walks in the country or their sojourn in camps, Paul B. Mann and George T. Hastings have collaborated in the writing of *Out of Doors, A Guide to Nature.* In their preface the authors seem to visualize something that will not be a school textbook, but it would appear that what they have produced is a rather happy combination between textbook and "friendly guide". We do not see why this volume would not make an admirable textbook at the same time that it serves its other purpose as a handy handbook in the outdoors. The publishers are Henry Holt and Company.



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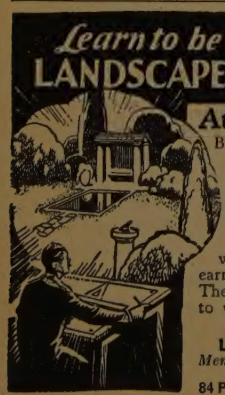

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Catalogue of Books on Game

From the press of Houghton Mifflin Company has come one of the most comprehensive and valuable books on American Natural History and Conservation that has ever appeared. It had its inception in the catalogue of the incomparable library on sport and travel gathered by the late Charles Sheldon, noted as a sportsman and conservationist, which is now the property of Yale University. The list covers the period from 1582 to 1925. The author is John C. Phillips.

Part I, covering more than 400 pages, lists alphabetically, generally by authors, several thousand titles, mostly of books. These cover most of the volumes on travel, hunting and natural history relating to the United States and Temperate and Subarctic Canada, the numerous and fascinating volumes on Arctic Exploration, however, not being included.

Part II, pp. 419-573, is on Conservation, with sections under General Conservation, Fur Seals, the various Government Departments, the States and Territories, and the Provinces of Canada.

Part III is on Periodicals, etc., and these are classified in sections under scientific journals, and those relating to hunting and outdoor sports.

The value of this catalogue can hardly be overestimated, whether one is interested in our wild life from the standpoint of sports, science, observation, or conservation. Doctor Phillips and his collaborators have placed all those in any way concerned with our great wild-life resources deeply in debt by placing at their disposal this very complete catalogue. The price is $10.

On Growing Holly

The possibilities of growing holly as a profitable crop are increasing rapidly as indiscriminate and unrestricted gathering of the native growth increases. With holly inseparable from our celebration of the holiday season, a source of supply for the future is essential. This offers an opportunity to the owner of land, and the recently issued bulletin of the U. S. Department of Agriculture entitled *Growing Christmas Holly on the Farm* shows the way. This is Farmers' Bulletin 1693-F and is available for five cents from the Superintendent of Documents, Washington, D. C.

South Dakota Flora

William H. Over, Curator of the Museum of the University of South Dakota at Vermillion, is the author of *Flora of South Dakota.* This is a booklet containing a check list of the flowering plants, shrubs and trees of the state with a group of excellent photographs of many of these. The booklet is published by the University and copies are available at one dollar each.

Conservation Text

An interesting conservation text is that entitled *Plant and Animal Neighbors* by Frank B. Younger. It is a companion volume to another conservation text on Forestry and both are a part of the Exploratory Science Series edited by Professor C. O. Davis of the University of Michigan. The book is designed for junior high school use. It is published by the C. C. Nelson Publishing Company of Appleton, Wisconsin.

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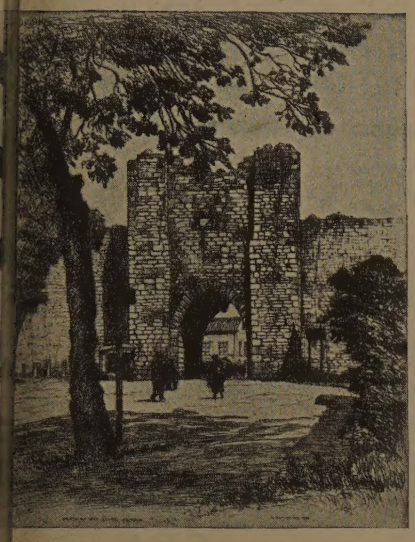

Gate in City Wall at Visby

(From an etching by Caroline Armington)

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A Science Course

Compiled as a result of the cooperative curriculum plan operative for the last three years in the seventeen northern California counties, *A Suggested Course of Study in Science for Elementary Schools* constitutes an excellent and valuable contribution to Nature education. It is published as a Department of Education Bulletin of the State of California. The course is carefully planned to lay a sound basis of Nature knowledge, and, through wise selection, to intrigue the student into the desire for a wider knowledge built upon this foundation. California is already one of the outstanding states in recognition of the value of Nature study in the elementary schools, and this latest addition to material in this field serves further to emphasize this leadership. In addition to the course itself, which covers the first six grades, excellent reference is made to collateral textbooks and to other sources. We may, perhaps, be pardoned the thought that specific reference might have been made to more of the California articles that have appeared in NATURE MAGAZINE during the past ten years. They make quite an imposing list, including the California issue of NATURE MAGAZINE.

Nature Sanctuary

Bird and flower lovers will find a true haven in the Pleasant Valley Bird and Wild Flower Sanctuary conducted by an association with this title and located between Pittsfield and Lenox Village, Massachusetts. The sanctuary now includes 306 acres of meadow, woodland and streams on the slope of Lenox Mountain. The Association was incorporated in 1928 and the sanctuary is maintained by the dues of its members, the minimum dues being ten dollars a year. Various committees direct special work, such as the trail activity, bird care, wild flower protection and the like. Some 130 bird shelters are provided and several feeding stations are maintained. A resident naturalist is on the property. He is S. Morris Pell. During the last year 145 species of birds were identified and listed, and the roll of wild flowers found in the sanctuary totals 228 species. Exhibits are being collected for a museum and an endowment fund is being built up for this project. A beaver preserve has been built and stocked. In the four years in which the sanctuary has been established amazing progress has been made in establishing a unique Nature haven and it has all been done on a "pay-as-we-go" policy. The president of the Sanctuary Association is Thomas F. Davies, Bishop of the Episcopal Diocese of Western Massachusetts.

Primitive Areas

In line with the policy of the United States Forest Service to designate certain National Forest areas to be kept virtually in primitive wild state, extensive sections have been set aside in the San Juan, Wilson and La Garita-Sheep Mountain sections of Colorado. Eleven primitive areas, totalling 715,078 acres, have been designated as primitive areas in Colorado and will not be opened by motor highways, summer homes, resorts or human settlement. The only improvements will be in the interests of forest fire control.

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CATS

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IS SOME REGULATION OF THE FELINE A WILD LIFE NECESSITY?

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CURLED up in the corner of the sofa or purring contentedly before the fire, Tom or Tabby looks like a much-domesticated, well-civilized pet. Even to intimate that this view is debatable is to invite the ire of many. The friends of the cat are legion, ranging from those who own felines with imposing pedigrees to those who befriend any and every alley cat. And the number of cats forms a greater legion than that of their defenders.

It is just this great number that moves us to risk the deluge and to say something about cats. They pose a question of outstanding interest to lovers of wild life. It is a question that becomes more important as cats increase and our wild life wanes.

An heritage from a wild ancestry, there remains innate in the feline, however finely bred, the instinct of the marauder. In the dim past its ancestor lived in and from the forest, preyed upon and preying. Predatory instincts in a civilized environment cost us great sums for police and courts and jails. This trait is, in a cat, natural, not discreditable; in man, punishable. But that it does exist makes the cat a problem.

The solution most frequently proposed is that licensing of cats be compulsory. To this proposal the American Humane Association, in a brief statement, raises protest, declaring that "the idea back of the project is that if there were fewer cats there would be more game for sportsmen to shoot." It is true that most of the inspiration of the movement to license cats comes from sportsmen. It is likewise true that if there were fewer cats there would be more game. And, further, it is a fact that, as the Humane Association says, "there would be more game if there were less shooting."

It is plain that, between the hunters and the cats, the game birds are in a sad way. It is our ardent hope that it will not be long before sportsmen recognize the inevitable and put their own house in order. At the same time we cannot see why, in the event of such a millennium, the feline should be preserved in a monopoly on hunting.

The Humane Association asserts that the public will have no sympathy with the licensing idea; that the farmer will not relinquish the aid of the cat in fighting rodents; that cat lovers will organize and post ten times more land against gunners. This last argument, we fear, is likely to appeal to bird lovers and true conservationists as an excellent reason for licensing cats.

We agree that the licensing idea is not a good one. We feel that a license for the cat would give it a preferred status as a killer. There are too many of these already. And we believe that cat license laws would be even less readily enforceable than are the current dog licensing laws. We recognize that one can fence against the dog fairly effectively, but that no fence discourages a cat.

While we are alternately agreeing and disagreeing with the Humane Association, we do not feel that the whole picture has been given. Our birds of song and beauty are favorite victims of the marauding cat. We have every sympathy with the bird lover who, having watched a family of baby birds develop in the back yard nest, destroys by the most convenient means available the cat which is about to wipe out the little family. If this cat bore a license there might be a lawsuit. As it is there may be nothing more serious than the exchange of a few harsh words and a coldness between one bird lover and one cat lover.

Now that we have discarded the license idea for what we regard as adequate reasons, what remains? Not much, we fear, except the naïve hope that we are progressing in our ability to think of our fellow man. There is great joy and value in our human affection for a dumb creature, whether cat, dog, horse or other. But when we let that love become so dominating and so selfish that it infringes upon the right of our neighbor to invite songbirds to his bird houses, feeding tray and bird bath, we forfeit rights of consideration in return. As for the thousands of criminally thoughtless and inhumane people who turn cats loose to fend for themselves instead of turning them over to the local humane society, they have no right to the affection or companionship of any animal, dumb or otherwise.

Let us recognize, then, that the cat is naturally and frequently a predator; that the extent of damage done by the marauding feline is our own human responsibility; that the welfare of wild life in general demands a far better control of the homeless cat; and that those who wish to keep such a pet should feed it well and seek to keep at a minimum its urge and opportunity to hunt.

"HE HAD FALLEN FROM THE NEST, A FLUFFY, FRIGHTENED, BLUE BALL OF A BABY; NOSED AND WORRIED BY A DOG."

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BLUE JAY, B—370020

BY JULIE CLOSSON KENLY

ILLUSTRATED BY R. BRUCE HORSFALL

PSYCHOLOGISTS tell us that it is not an infrequent thing for early misfortune to hoist us into subsequent greatness, and this seems to work in the case of blue jays, as well as of men. A blue jay, banded B-370020 not in a spirit of scientific research, but purely because he is unique among birds, has, truly, attained jay fame. Such a one was "Jaykee."

Jaykee's foster parents discovered him on a June morning, shortly after the initial tragedy which was to usher in his future distinction. He had fallen from the nest, a fluffy, frightened, blue ball of a baby; nosed and worried by a dog. But neither his orphaned state, nor his fright served to keep him awake when he had exchanged a cradle woven of twigs for one woven of splints —a bushel basket in which he spent the first night of his now changed existence, sleeping contentedly as a baby should who was, from that hour, to be a center of neighborhood interest.

With this delightfully human story of Jaykee we welcome to our pages for the first time, Julie Closson Kenly. To the telling of this little tale of a bird with a personality, Mrs. Kenly brings the same charm that she imparts to her three books on the wild world and which, we are sure, many of our readers already know.

His feeding was carried on, at first, by means of a medicine dropper or a match; and he was greedily appreciative of such varied fare as blueberries, lettuce, mashed potatoes, cereals, crushed nuts, birdseed and meat, while, in early youth, milk was his passion. Indeed, he would absorb such quantities that it seemed as if he must be filled with sponge! and in line with these human preferences, he showed equally human dislikes. When his anxious foster parents decided that two and a half ounces was underweight for a baby jay, and resorted to codliver oil to fatten him, he looked upon the matter as an insult. Opening his trusting bill one day, in expectation of milk, and receiving a generous squirt of oil instead, his indignation knew no bounds. So outraged was his confidence that he refused to be fed for some time after that, through fear that he might again be betrayed into this loathsome form of vitamin D.

Following the normal course of any babyhood, Jaykee slept for the first ten days nearly all the time: perched, perhaps, on some one's hand; or on the spout of the watering-pot; or the steering wheel of the car; drowsily, drowsily, his lids would mist over his bead-black eyes, and the next moment he would be lost in jay dreams—possibly of worms, possibly of milk, possibly of nothing at all.

Table manners are, in essence, artificial; and Jaykee's were of the most unaffected kind. As he grew old enough to use his wings, he would flutter down, landing sometimes directly in the center of one's plate. Once he plumped into the middle of the mayonnaise dressing, and arose, disguised as a canary! Another time, a blueberry pie was being served, and of course there was a clean tablecloth —that is the unfailing forerunner of any accident either to pies or platters. The space where some slices had just been cut was filled with a delectable puddle of dark crimson juice, and from the edges bulged the berries Jaykee loved so well. For a moment he meditated, his head cocked on one side, then splash! he landed in the middle of that glorious juice, trampling it as if he imagined he was in an Italian wine press! The shriek that followed made him realize that he had committed a *faux pas*, and hurriedly he leaped out upon the table cloth, embroidering upon it a pattern of foot-prints; an indelible memento in blueberry-ink script to the effect that one, Jaykee, had passed that way.

It was most interesting to watch the dawn of Jaykee's

". . . AN INDELIBLE MEMENTO IN BLUEBERRY-INK SCRIPT TO THE EFFECT THAT ONE, JAYKEE, HAD PASSED THAT WAY."

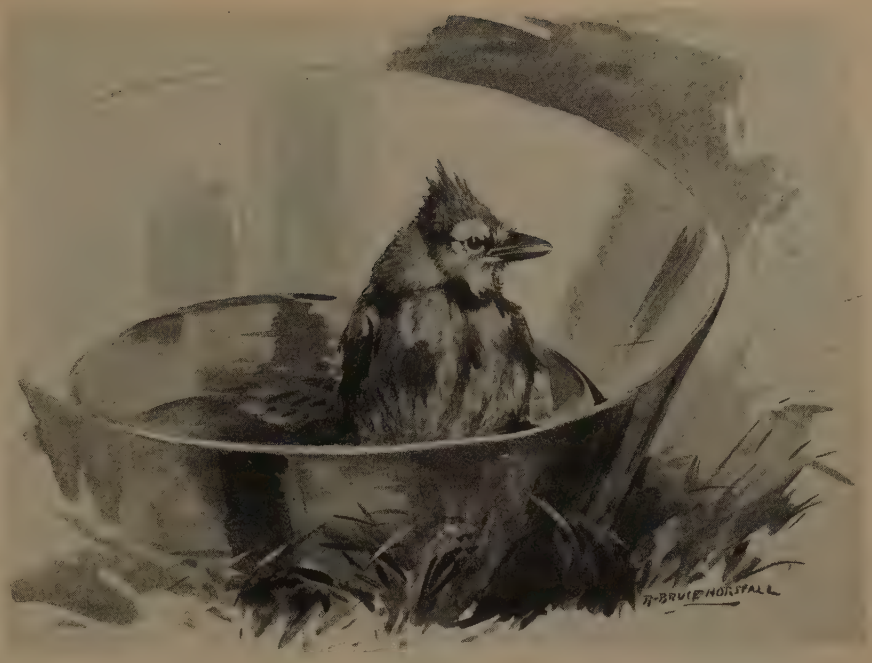
faculties, and the individuality that went so far in proving to his friends that he was not a mere chattel of instinct. His surroundings were, of course, nothing for which instinct could have prepared him. His whole life among human beings, free to come and go as he was, must have been a continual negation of blue-jay inheritance. Yet, even measured by our standards, Jaykee adjusted himself to an alien society quite as well as do its own young children. In many ways Jaykee was a singularly human little person. For instance, the first time he discovered that he could put his head under water when he took a bath, he fairly twittered with pride! So enchanted by his performance was he, that he repeated it until he was thrown into chills, and had to be wrapped in hot towels and fed on hot milk to revive him. Possibly if he had had a jay-bird mother to teach him, there would have been conveyed to him the knowledge that, even in so desirable a matter as cleanliness, excesses must be frowned upon. In the same fashion, the first day he discovered his ability to make a true jay-bird squawk, he was delighted with his performance, and spent twenty excited minutes hunching himself down, and then drawing himself out, in the manner of a small accordion, while giving the raucous and familiar sound. It was easy to see that Jaykee was aware that he possessed genius of a sort. But it was to his mistress that he confided the sweetest part of his nature. He would talk to her by the hour, seated on her hand or her shoulder; sometimes dreadfully emphatic, but usually in a voice that he kept especially for her endearments. This voice did not have a jay quality at all, for it came through his closed bill, and seemed something like a coo, and something like the giggling noise a goldfinch makes when talking to himself. It was an appreciative sound, and uncannily like a language the words of which one could not understand, though the meaning was clear enough.

Jaykee's accomplishments were not of the stage variety; he was not taught conventional tricks, rather was his own personality allowed free rein, so that he could express himself with the least artificiality possible. Everything he did was original with him, and he seemed to find the same pleasure in play that one associates only with kittens and puppies. He dearly loved to be petted and talked to. He loved to have his bill stroked, and his feathers tickled. Then, too, he invented games for himself. One of these was to thrust his bill between the fingers of one's closed hand, tugging and pulling to free himself again. Another was putting pebbles into the familys' shoes; prodding them down between the leather and the stocking. Or—he was a New Jersey jay—he became an adept at catching mosquitoes. A writer on Jaykee's accomplishments says: "Whether Jaykee knew that I did not like mosquitoes, or whether he just realized that this was an unexpected savory at the end of his feast, I do not know. But I do know that he hopped on to my arm and caught one mosquito in the air, picked one off my wrist just at the edge of my watch, and gathered in another one from my right hand. I could feel two biting me on the side of my fist, which he could not see, so I just quietly turned my wrist and said: 'Jaykee, would you mind picking up these two?' Jaykee reached out and nipped them off as prettily as you could wish."

True to his bringing up, Jaykee was fearless where men were concerned—if he liked their looks—but afraid of animals in the same degree as any other jay. One of the most curious things learned through him, was that the little creatures living in the woods about the house, squirrels, chipmunks, and wild birds, took the most intense interest in his every movement. They seemed to be perfectly aware that a bird, holding the status of a human being and dining on the porch with the family, was an unheard of thing. Every meal was watched by a company of absorbed onlookers; squirrels, sitting erect, their necks craned, their paws clutched over their breasts, regarded the sight with breathless interest. From all sorts of unexpected spots little furry faces would be thrust, staring, staring, at this strange sight of a jay-bird eating from a china plate. One member of the family confessed to feeling a sense of real embarrassment at the pitiless

publicity of her meals! Bead eyes, and eager faces staring at her, as part of the amazing spectacle. A cat-bird not only watched the diners, but exhibited what appeared very like a case of class consciousness, for she scolded fiercely about the matter. What right had jays to pie? What sort of a social order was this that put untold luxuries into the claws of one bird, and ordained that another should scratch for a tough bug, or an earthworm without even salt?

One of Jaykee's less pleasing habits was to hide scraps of food in the furniture of the porch and living room; stuffing them down between the backs of chairs and cushions. The onlooking squirrels showed, in this respect, that they had been doing a bit of logical thinking themselves as they watched this child of fortune, for, when Jaykee's back was turned, they robbed the chairs; sometimes in their excitement even pulling out by the roots the very buttons tufting the cushions.



"... THE FIRST TIME HE DISCOVERED HE COULD PUT HIS HEAD UNDER WATER WHEN HE TOOK A BATH, HE FAIRLY TWITTERED WITH PRIDE!"

As a rule, Jaykee was fond of visitors, but first he had to give them whatever jay slang is for "the once over," before he admitted them into his personal friendship. If strangers arrived, Jaykee would sit on the roof and eye them, his head cocked skeptically first on one, then on the other side. If he liked their looks, he would descend to a lower level, and secrete himself in the tin rain gutter, only his head poking out and peering dubiously down. Did the guests pass this final test, he would flutter among them, and spend the afternoon playing and talking; thoroughly enjoying the attention and amusement he created.

Another curious phase of Jaykee's intelligent grasp of an entirely different environment, was the fact that he was able to look *through* the glass of the windows and into the room. Other birds, as well as squirrels, appeared to find the reflections on the glass a definite barrier to what lay beyond. One could stand close to the panes without alarming in the least the creatures who might be sitting on the very sill itself. But Jaykee not only kept watch of the windows, and followed what was going on in the house, but he would know when his mistress passed from room to room, and flew, at once, to the right window to catch a view of her. No matter how quietly she stepped, if she were too busy to feed him, there he was, his blue face pressed against the glass.

Of course we can only judge of what a bird feels by what he does, and what he does may not mean the thing it appears to, but on the return of his mistress, after a day or two of absence, at first he did not seem to recognize her, then, gradually remembering, he burst into a sudden flood of conversation, and flying over, lighted on her shoulder and—deliberately kissed her on the mouth! A peck of a kiss, but the best he knew how to give. Science may frown on this interpretation, but to "bill and coo" is an expression that originated from the love making of birds. Jaykee may not have intended his greeting for a kiss, he may not have been intrinsically romantic, but at all events he expressed his pleasure by a very familiar gesture! A jay with the advantages of human society and example might be expected to act in such a manner.

As a child, Jaykee was taken into the house every night, where he went dutifully to sleep on the rungs of a chair. But jays seem strangely like other modern young people, for one night when he was called to come to bed, he did not answer. It was Jaykee's declaration that he had become of age. He wanted a latch key. And never after that night, until it was firmly established in his mind that he would not be put to bed unless he wished, would he tell where he was perched in the trees about the house. But once he understood that he could regulate his hours himself, he would come down as usual at call, and say good night to the family.

The growth of Jaykee into blue-jay manhood was very interesting to watch; the more he asserted his rights, the more rights he wanted to assert. He grew rowdier and rowdier as he associated with the wild jays about the house, who had not had the same cultural background. Jaykee's especial feed box was placed so that the porch roof sheltered it. It was, in a sense, posted. No other bird dared venture there. But as Jaykee grew older and more sociable, he would bring a friend home to dinner once in a while; then two, then three, and finally as many as six. If one of the family stepped out on the porch, however, there was panic among the guests at Jaykee's dinner party, and only he would be left, the rest of the company darting away in terror.

The story of Jaykee has a strangely human smack, all

the way through, because as he acquired the habit of the gang his whole nature suffered accordingly. From a gentleman jay he became a squawking, blustering little bird tough. Where once he would come into the house and wait with great politeness to be fed, he now seized his food in the most belligerent manner, though he did not become less fond of the family, or less tame; indeed, he was a well known character with his neighbors, though not always a welcome one, as when one of the children, living near, ran screaming into the house to tell his mother that a great bird was attacking the baby. On rushing to his rescue, the friendly, but unappreciated Jaykee was found perched on the baby's head, examining with great interest a scalp which presented such a soft and fluffy mat to his feet.

Where is Jaykee now?—left behind for the summer. Banded, and in all probability the father of a blue-jay family of his own. Let us hope one of his children will have the good luck to fall out of the nest and into the keeping of Jaykee's foster parents, who know nearly every living creature on their place, not as mere acquaintances, not as mere tenants, but as a personal responsibility, to be met, through the year, by hundreds of pounds of dry corn; bird-seed, crumbs and suet; not to mention first aid and hospital aid.

". . . THE FRIENDLY, BUT UNAPPRECIATED JAYKEE WAS FOUND PERCHED ON THE BABY'S HEAD"

Many interesting conclusions can be drawn from the study of this sophisticated little blue jay. The most pertinent one is —know thy bird. Know him alive and uncaged. Know him, not from skins and charts, but from intimate association with him. When this is done, not alone from scientific curiosity, but from the illuminating angle of friendship, one feels sure that a bird is no mere mechanism, plugged into the great electric circuit that is represented by the forces of Nature: a mechanism, many would have us believe, that runs as automatically as a lamp or a waffle-iron. Jaykee, for one, was a bird of personality. No waffle-iron has that—and logic is logic.

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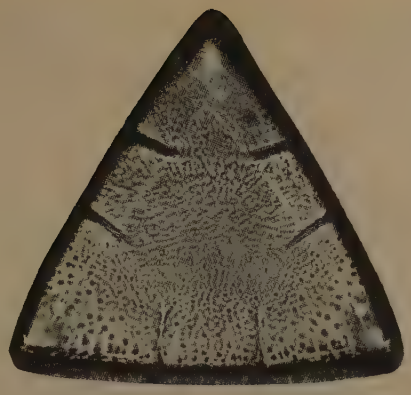
THE APRIL NATURE MAGAZINE

How many kinds of fog are there? If you do not know the answer to this you will find it in Charles Fitzhugh Talman's article in the April issue. Summer is not far off and the wide open spaces will be calling soon. The camper and hiker will find much of practical value in the second article in our camping series by Arthur Newton Pack. Dr. Ramme's fascinating pictures of insect faces created much interest and response from our readers. Another group of his photographs showing amazing protective formations of insects will appear in April. Was Rafinesque, the famed naturalist, a madman or a genius? You may draw your own conclusions from Donald C. Peattie's biography of him next month. Have you a small garden problem? Romaine B. Ware writes for those who must make a flower paradise out of a tiny yard. These and other features will be found in the April issue, which will help usher in spring.

LILLIPUTIAN ARCHITECTS OF THE SEA



BY LOUIS E. REICHARD

WITH ILLUSTRATIONS BY COURTESY OF THE CARNEGIE INSTITUTION OF WASHINGTON, D. C.

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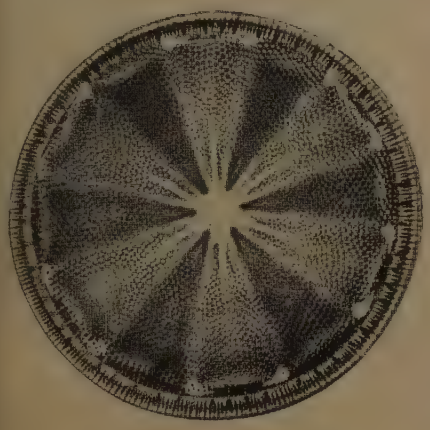
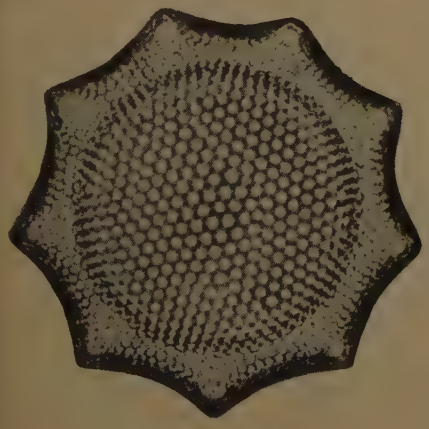
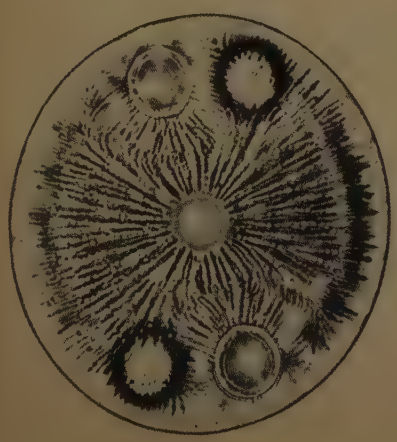
VARIED AND BEAUTIFUL ARE THE CRYSTAL PALACES WHICH THE DIATOMS BUILD FOR THEMSELVES TO LIVE IN





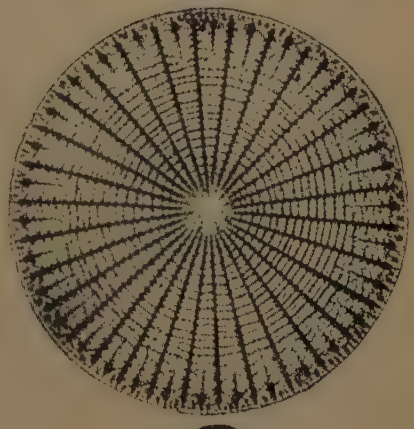


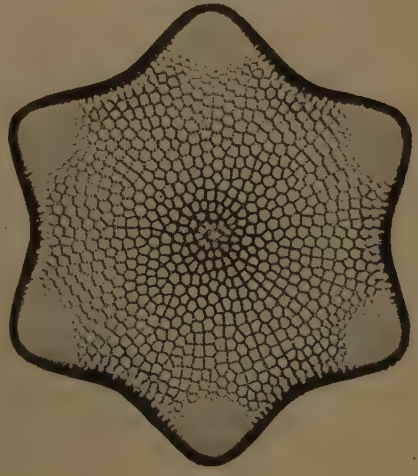
AMONG the myriad of queer and fantastic forms that live and move and have their being in the vast expanses of the seven seas, there is a plant so tiny as to be invisible to the unaided eye. Despite the fact that a hundred or more of its kind may find standing room on a pinhead without danger of overcrowding, it serves either directly or indirectly to sustain practically all animal life in the ocean. Even such huge monsters as some whales and sharks, in the final analysis, must depend for the satiation of their voracious appetites upon these minute forms; not that these rapacious giants of the sea are being converted to a vegetarian diet, but that they feed on the smaller fish that in turn prey on still smaller ones, until eventually we come to the tiniest, and their crustacean food, whose bill-of-fare consists mainly, if not exclusively, of these "Tom Thumb" plants.

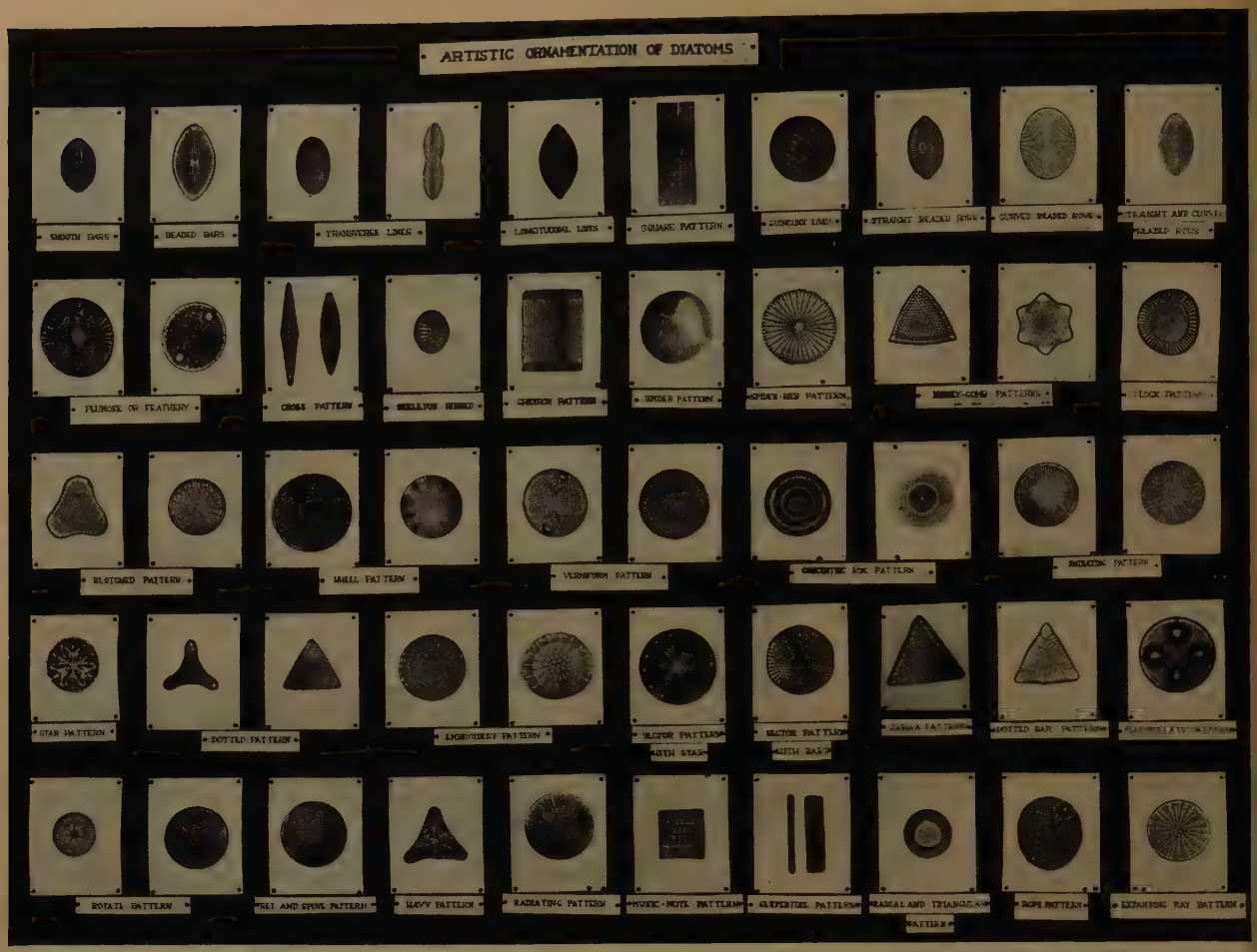
Despite their microscopic proportions and because of their exceeding abundance, these minute plants, known as diatoms, form great green pastures in the sea, converting certain areas into a sort of thin vegetable soup well seasoned with salt, though pepper may be lacking.

In the sea as on land animals must depend upon plants for the transformation of the organic substances of the earth into the inorganic materials that can be drawn upon to supply the life processes. Carbon, hydrogen, oxygen, nitrogen, phosphorus, potash, and other substances, in

THE VARIOUS PATTERNS REVEALED BY THE MICROSCOPE HAVE SUPPLIED ARTISTS AND DESIGNERS WITH MANY IDEAS







A COLLECTION OF PICTURES OF DIATOMS IN MANY DIFFERENT SHAPES

Not only are they beautiful and interesting but the diatoms hold a store of oil and when they die they make deposits of valuable earth that man has turned to his own uses

the words of Dr. Albert Mann, foremost authority on diatoms, "do not juggle themselves into edible compounds. It is only by the alchemy of the green chlorophyl-bearing plant that these combinations are brought about."

The diatom, smallest of marine plants, is a prodigious worker. In some mysterious way it manages to hitch a sunbeam to its own manufacturing plant, and then turns out from the raw material of mineral matter the vital material of plant tissue. It is on these tiny toilers of the sea that the ocean vegetarians depend for their three square meals a day.

The diatom, single-celled pigmy of the marine world, is not, however, confined to the sea. It may be found in waters of almost every description—cold, tropical, still, running, fresh, salty; in the old swimming hole as well as in the vasty deeps.

Because it is so small the diatom must occur in exceeding abundance to supply the food demands of marine life. In a valiant effort to meet this condition, and to make up in numbers what it lacks in size, it reproduces with astonishing rapidity and in a manner that is strange, to express it mildly. Scientists, of course, do not contend that diatoms have any knowledge of arithmetic; nevertheless, in the process of reproduction they resort to division and multiplication. For example, whenever one wishes to reproduce it simply divides itself in two. Then each of these two in turn divides in two, making four; and so the process of dividing and multiplying continues until there are soon great, great grandchildren without number. Indeed, it has been estimated that if a single diatom were thus to divide into two in twenty-four hours, and its offspring were to follow suit, in the course of a single month there would be a billion members in the family.

Though the great value of diatoms probably lies in their importance as a source of food supply for the marine world, there are other reasons why they are unique in plant life. One of their chief claims to distinction lies in the fact that each of these microscopic organisms builds for itself a wonderful silica home consisting of two valves that fit together somewhat as do the top and bottom of an ordinary pillbox. By some remarkable process each plant, acting as its own architect and building contractor, constructs for itself a dwelling place as extraordinary for its rare beauty as for its tiny proportions.

Scientists have discovered that, unlike some of our unimaginative human architects who design rows of houses that are distressingly alike, the diatom shows an amazing penchant for originality and variety. The microscopic shell palaces appear in the form of circles, squares,

triangles, stars, crescents, ovals and wedges that are beautifully ornamented in complex and intricate patterns of beading or exquisite lacework. The silica home of each Lilliputian artificer bears marks of its designer's individuality; nevertheless, there seems to be such a strict adherence to the diatoms' building code that the learned scientist may recognize in the plant born in the historic Potomac today characteristics that identify it as a full-fledged sister of the same type of plant born off the coast of Australia countless years ago.

Because of the extraordinary beauty of their silica palaces, these "Tom Thumb" architects of the marine world furnish to the manufacturers of fine laces, wall papers, printed fabrics, and various articles of artistic quality a veritable gallery of art from which, with the aid of a powerful microscope, they may select one or more of an inconceivable number of designs and patterns.

The midget plants have been aptly termed the "darlings of the microscopist" because they furnish the most accurate and satisfactory test known for determining the perfection of microscopic lenses and accessories. Indeed, any microscope that makes visible the minute and exquisite ornamentation that overspreads certain particular species of diatoms need give no further proof of its optical excellence. The fact is that the best microscopes of today are tested with one or both of two species of diatoms.

Diatoms are remarkable in still another respect, for despite their insignificant proportions each of these tiny organisms boasts an oil well that constitutes from five to forty-five per cent of the plant's bulk. It may even be that we owe some of the joys of motoring to the diatom, since scientists do not find it unreasonable to suppose that the oil released by these minute plants at their death and disintegration has accumulated in immense volume through the ages and been converted by Nature's mysterious processes into petroleum. It has been estimated if the oil originally produced by diatoms in one known deposit alone represents only one-tenth of their bulk, the quantity would be sufficient to form a lake more than twelve miles square with a depth of 1400 feet.

The diatom's usefulness does not cease upon its death. On the contrary, it continues from the moment the wee plant begins to secrete its protective covering of pure silica until countless years afterwards. When it dies, which it does within a few short days, because its life span is very short, its crystal casket finds a burial place in the ooze of the ocean floor. Through the ages great deposits are formed, and then during one of Mother Earth's violent convulsions such accumulations are lifted from the ocean bottom and become dry land. So Nature makes available to man great deposits of what is known as diatomaceous earth.

California, characteristically, boasts one of the very greatest of these deposits. Inconceivable as it may seem, one deposit in the Golden State now covers an area of twelve miles square to a depth of 1400 feet. And Richmond, Virginia, is said to rest upon a twelve-foot stratum of these microscopic jewel boxes.

In addition to serving as a foundation for a Virginia city of several hundred thousand inhabitants, diatomaceous earth has numerous commercial uses. Its extreme fineness and hardness make it very valuable for polishing and grinding surfaces where a high lustre is desired. Because it is a non-conductor of heat it is used extensively in the material that serves as a sort of "overcoat" for pipes in cold-storage plants. Steam pipes and boilers also wear "wraps" made partly of diatomaceous earth. As a filtering agent for varnishes, oils, and other heavy liquids it is invaluable.

Years ago, before Uncle Sam's food laws had become as stringent as they are today, it was used as an adulterant in candy. And a tooth powder widely advertised and extensively used until a few years ago consisted almost entirely of the vacated silica homes of diatoms. Its use was discontinued because of its effectiveness, for it not only cleaned and polished the teeth, but wore away their enamel covering as well.

Science emphasizes the fact that in Nature there is little, if any, relationship between size and importance. According to Darwin, the huge elephant plays a less important rôle than the humble earthworm. So in the ocean the whale, largest of all living creatures, must be content with a minor part when compared with the diatom.

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THE TEN-YEAR INDEX

Anyone who has ever been concerned with the making of an index will appreciate the task we faced in compiling a thorough index to the first ten years of Nature Magazine. The fact that we wished to make this as complete as it was humanly possible, combined with the fact that we did not realize the immense number of references involved, acted to delay slightly the long and tedious mechanical details of index-making. We appreciate the response of our readers, both those who expressed the opinion that the task should be done and those who have placed their orders. The index will soon be available at one dollar a copy, and readers who have the magazine for the entire ten years, or for only a part of that time, will find it an invaluable help in looking up the multitude of Nature references of the past decade of our publication.

PHOTOGRAPH BY B. F. WHITE

MISS MORSE WITH JUST A FEW OF CALIFORNIA'S FUNGI

The velvet fungus, the sulphur fungus, some inkcaps, a single earthstar—sometimes called the poor man's weather glass—appear in this jocund company. Some of these are deliciously edible, others, though not poisonous, are too woody to eat

PODAXIS, A STALKED PUFFBALL

BY ELIZABETH EATON MORSE

TO MANY the word *Podaxis* may suggest those two extremities of our earth sought by explorers in airplane, submarine and dog-sled. It is hardly safe, however, to jump at conclusions. *Podaxis* is a fungus—a puffball—having nothing in common with exploration unless it be the fact that it is to be found the world around within a rather well-defined belt between the fortieth parallels north and south of the equator. Also, it has been the subject of varied scientific exploration, an activity probably not as spectacular as polar dashes, but none the less fascinating to those engaged in it.

Podaxis has a number of claims to fame in the world of fungi. While it has been known to botanists for at least two and one-half centuries, its life history has never been fully made out. It has been given various scientific names, and has been thrown into classifications where it does not properly belong. And it is not "common," a fact which adds to the enjoyment of studying it and in trying to find for it its proper niche.

About four years ago, having seen some dried specimens from the Colorado Desert of California, I set out to see if I could find it growing there. Many localities were visited; many persons asked and always the response, "We have never seen your plant!" Then, two weeks after returning to my laboratory, there came a packet from Mrs. H. W. Smiley of Indio, California, and in it were three small specimens of *Podaxis*. With these I was launched upon the work of endeavoring to seek out some of the intimate details of the life of this interesting and elusive fungus.

Were you to encounter *Podaxis* in your rambles you might at first think that you had chanced upon one of the species of

Miss Morse, the author of this story of Podaxis, is secretary of the California Mycological Society with headquarters at Berkeley. When Miss Morse retired as a teacher of art in the public schools of New York City, she went to California to enjoy a well-earned rest. The "rest" has taken the form of collecting different species of fungi, from the Mexican border to Skagway, Alaska, and up and down the mountain ranges, followed by a study of the marvelous fungous plants of the Pacific Coast region. A longer account of Miss Morse's work with Podaxis, fully illustrated, appeared in the January-February issue of "Mycologia."

inkcaps, known scientifically as *Coprinus*. A bit uncertain, and, also, perhaps, slightly mystified, you would examine it. You would then know that it was far from being an inkcap. You would find that this odd fungus has a hollow stem extending right through the puffball to the summit. (There are one or two rare exceptions. See the second illustration.) The stem is attached at the top by a narrow isthmus to an enclosing scaly envelope known as the peridium. If it was a young plant you had discovered, you would find that the chamber between the peridium and the stem was filled with a soft, white, spongy tissue. This is the part of the fungus that "goes to seed."

As *Podaxis* grows older and larger, the tissues inside gradually change in color from white to various shades of yellow and orange. By the time the plant has reached full maturity they become a rich, reddish-brown. Finally, the peridium splits from below upward, the now ripened tissues become powdery and the spores are scattered by the wind to find lodgment; these, in process of time, may produce other plants.

The foot (pōd), which gives the plant its name, consists of many fine, white, root-like threads which branch continually and collect a mass of sand or soil. Frequently there are long projections from the foot which extend far down into the ground. I have observed in *Podaxis* all kinds of feet—the perfect foot, the club foot, the foot of a Russian dancer and other distinctive forms.

While it is still under ground *Podaxis* may become quite a sizable plant, often growing up to three inches before it breaks through the surface. Coyly, its appearance above ground seems usually to take place at night. I know of no one who has seen it break through the surface. Once this event occurs, the plant grows rapidly, adding from one to two inches a day until maturity. The tallest specimens collected from the Colorado Desert measured ten and one-half inches, although from five to seven inches is the average. The widest peridium measurement was four inches in diameter.

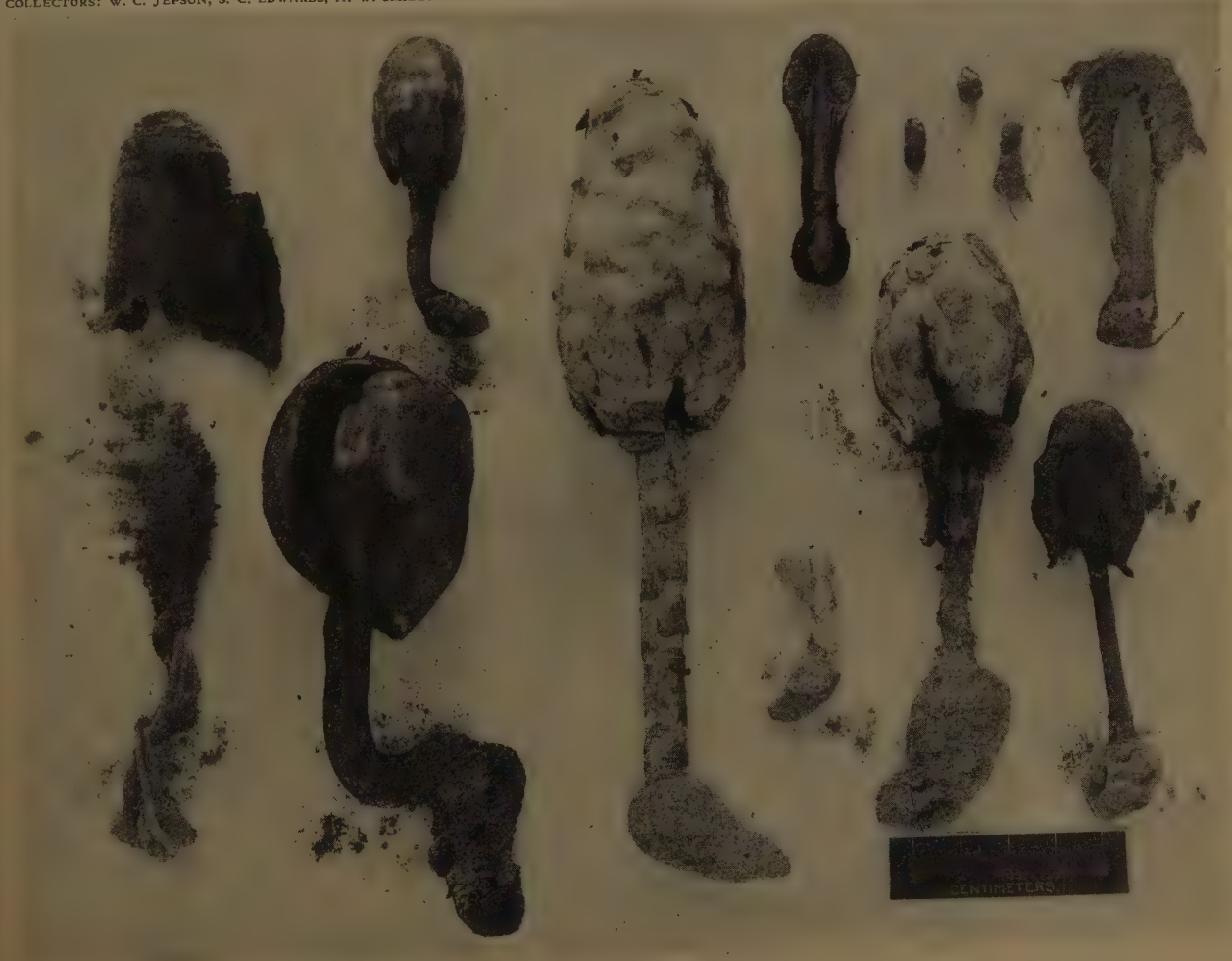
While *Podaxis* seems, normally, to grow singly, Mrs. Clary of Coachella, California, found as many as nineteen specimens in a single cluster at Palm Springs. These were held together by interlacing strands of root threads which with the soil made a solid, compact mass. This variation in habit is paralleled by the breadth of range of the fungus. It has been collected at El Centro, sixty-five feet below sea level, and in the Panamint Mountains of south-

PODAXIS, THE STALKED PUFFBALL OF THE COLORADO DESERT, AT ALL STAGES OF GROWTH

Very young plants when dug up look like tiny balls of sand. The foot, stem and head may vary much in size and shape. A growing plant is creamy white in color and often glistens like mica. Fully ripe plants become dingy and discolored by the powdery spores

COLLECTORS: W. C. JEPSON, S. C. EDWARDS, H. W. SMILEY

PHOTOGRAPH BY W. C. MATTHEWS



eastern California at an elevation of five thousand feet.

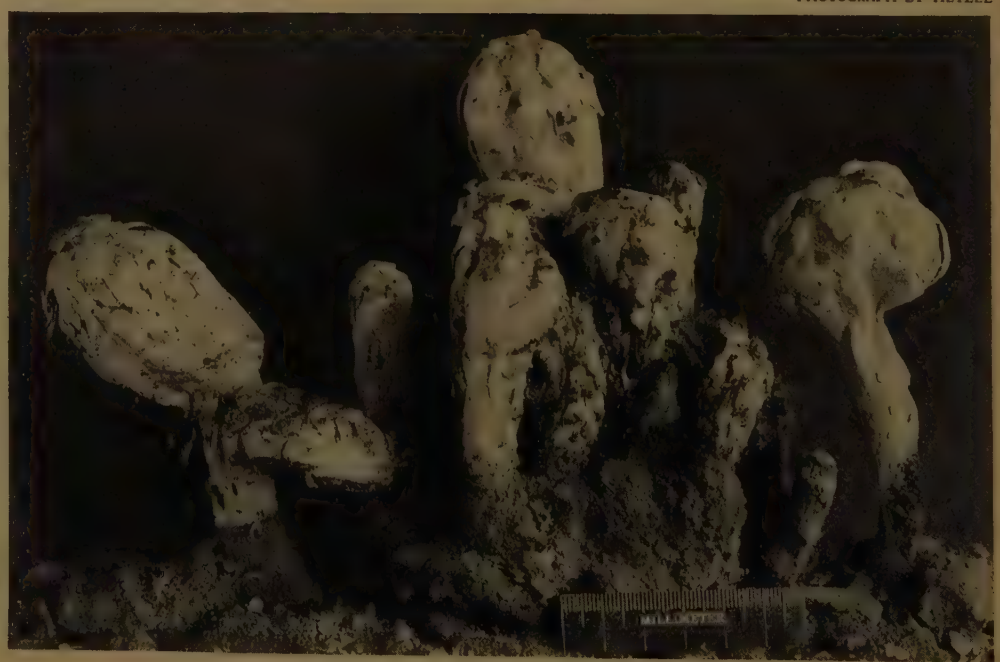
The Colorado Desert in California cannot boast that it is the sole place of residence of this strange and beautiful puffball. It has been collected in limited areas in north, west and south Africa, also in the islands northwest of Africa. It has been found on the island of Madagascar, in India, Hawaii, South America, and on the island of Jamaica. Occasionally it has been found growing in immense termite mounds in South Africa, in Madagascar and south Brazil. Some people have thought that the termites cultivate "fungus gardens," and there is some evidence that this may be true.

The natives in Africa have believed for a long time that *Podaxis* cures cancerous diseases. In fact, the plant was once called *carcinomalis,* which means cancer. It is also reported to be used by these natives as an article of food. Because the ripe spores are of such a dark color, they have been called locally "crow's snuff."

Due probably in part to the fact that *Podaxis* is so varied in form and appearance at different ages, it has been thought that there are different species. Instead of twenty-five species, I am convinced that there is probably only one.

So, in *Podaxis,* we have what may be considered a sand plant that is found occasionally around the earth in the warm belt. For all its interesting characteristics, it is one which has escaped the attention of most people, even that of many of those whose work or pleasure it is to observe and study all kinds of plants.

PHOTOGRAPH BY HETZEL



THE NOBLE SPECIMEN OF PODAXIS ABOVE WAS A RAPID GROWER

It appeared last September in the back yard of Mr. E. V. C. Northrop, El Centro, California, and grew six inches in five days. The fourth day it stalled and the fifth day it was dug up. A clump of plants like these collected by Mrs. Clary at Palm Springs is rarely met. These are young specimens, clean, white and glistening, with peridia still firmly attached to the stem

PHOTOGRAPH BY W. C. MATTHEWS

THE SEVEN LIVES OF AN ELM APHID

WHICH IS TWO LESS THAN A CAT'S BUT EVEN MORE INTERESTING

BY EDITH M. PATCH

IN THE beginning there is an egg. Its shell is dull dark purple, dusted over with a bloom of white waxen powder. It has lain all winter in a nest of fluffy white wax—a nest not big enough to hold the head of a common pin. With no other shelter than is afforded by a crevice in the rough bark of an elm tree, it has withstood the weather of zero days and worse. It is a very special sort of egg, as the egg of an aphid has reason to be. It took seven generations to produce it and the like of it will not be seen again until the seventh generation to come.

On a day in spring, just before the leaf-buds open, the fragment of life, which has spent the winter in cold storage, stirs to action. Emerging from its shell, the tiny creature creeps into a world composed of the deep valleys and gigantic mountain ridges of elm bark. Neither those valleys nor those mountains have food wherewith to succor her. The journey that lies between her and the first breakfast of her life is astoundingly long and rough. Yet with feet that neither falter nor hasten she passes through the depths of those valleys and over the tops of those ridges into a trail that leads along the less uneven branches, until at length she comes to a twig bearing a terminal bud.

There she waits—her breakfast being not yet prepared for her. Neither weary with her journey nor faint with her fasting, she waits. Minute by minute through daylight and darkness, through storm and calm, she waits, with no sign of uneasiness, for twenty hours, or it may be for two hundred; and then, neither too soon nor too late, as the leaves within her chosen bud unfold, she touches this one and that with her beak and drinks. Her fast is broken. The leaves of her bud pulse with the growth the surging sap brings to them, but they are changeling leaves bewitched by the magic of her touch, and even though every other leaf on the tree expands flat and open to the sun, these few are rounded and twisted and massed, into a structure not too mean to be her palace.

Thus the infant insect makes herself at home upon the ancient elm, within an abode the like of which has not been created by any member of her family for six generations past; for it is only the seventh daughter of a seventh daughter, counting by generations, who presides over such an establishment. For about a month she lives alone and, the days of her fast being over, she feasts well nigh continually, pausing but four times as her size increases to throw aside her skin like an outgrown garment. After attaining the estate of a fifth skin and the length of two millimeters she reaches maturity.

THE THIRD GENERATION MIGRATES
The first and second have had their home in the rounded and twisted leaves of the elm

No mate has entered her dwelling, and the daughters to which she gives birth are fatherless, for it is only once in seven generations that a male heir is known in the strange life of this strange insect. If the days of her own development were solitary ones, she makes up for it now, because in due time the palace is inhabited by her two hundred daughters or more.

These daughters, like their mother, feast—imbibing the sap that is pumped into the walls of their leafy rooms by the giant elm that, willy nilly, nurses them. As was true of their mother the stages of their growth are marked by four pauses long enough for them to break the bonds of a too-tight skins which is therefore discarded. After the fourth molt, they somewhat resemble their

A COLONY OF WOOLLY APHIDS OF THE APPLE
Such is established by the "spring migrant" and here live the fourth and fifth generations in wingless form

mother, being wingless like her. They do not, however, attain her length or girth of body; and the antennae, which arm their heads like two supple horns, are composed of six segments instead of five.

In their turn, they give birth to fatherless daughters and in due time the single family dwelling within the leafy palace (counting grandmother, mothers, daughters, granddaughters, aunts, sisters, and first cousins) numbers several thousands. Several thousands of individuals closely jostling one another as they seek so much space in the sap-veined walls as they may pierce with their slender beaks, and yet no quarrels. Thousands of bodies packed so tightly that one is never left untouched; and yet every one, from the eldest to the youngest, absolutely clean. All the animal life-processes of breathing, feeding, and casting aside their outgrown skins; and none of them unclean for a moment from birth to maturity. For there is no creature in the world tidier than an aphid. They are as neat as wax. Indeed, they are coated and dusted with wax, elaborated in their own bodies and thrown out through pores in their skins; so that they are constantly fastidiously groomed. What wax there is to spare forms a powdery coating over the liquid that overflows the hollows in the leafy floors of their home.

But marvelous as the sanitation of their dwelling, and marvelous as the mutual adaptations of their crowded family life, all is not well within these castle walls. The living springs of sap are running dry, the veins that have nursed these thousands of beaks have little more to yield. There is neither food nor room for another generation. Nor yet is there safety for, in their midst, their enemies are lurking. The cruel capsid with his murderous beak is stabbing right and left. The stealthy syrphid, like a leech, draws blood without mercy. The dreadful coccinellid with claws that crunch and jaws that munch has entered the fold like a ravening wolf. The three of them together make merry at a horrible banquet that threatens disaster to the aphid clan.

It is, however, ordained that this insect shall have seven lives; and it is but time for the third generation to undergo the final molt. As these granddaughters cast off their outgrown garment-skins they creep forth to the porches of their dwelling.

You see one on the edge of the twisted leaf and notice that she is different in a conspicuous essential from her mother and grandmother. Folded rooflike upon her back are four filmy wings, fair of form and frail of texture, yet firm enough for service. She stands at the portal of the dwelling, the leafy walls of which have served her family with all its shelter and sustenance during the development of three generations. She does no thinking as she stands there, because an aphid does not think. But *you* think as you see her standing alone upon the point of a leaf and it seems to you that she is very small and that the world before her, swept by the breezes from miles abroad and bright with the light from miles still broader, seems very large.

But the moment of her migration has come; and, with neither fear nor faith, she lifts her frail unfaltering wings and is lost in the endless sun and air. Lost to our sight. But she is not lost to her own life; for a sense of which we have no experience and can guess but little, guides her in her flight.

She comes to rest at last—be it a rod or a mile away—and though her feet have never before touched aught but the leaf of an elm, she is now standing upon an apple leaf. Once in seven generations, according to the traditions of her life, winged migrants must desert the elm and seek the apple. She has fed on nothing but the sap of elm from the day of her birth, nothing but the sap of elm has been sucked into the mouths of her mother and her grandmother before her; but she will henceforth have none of it—neither she nor her daughters nor her granddaughters. We do not know how it has come to pass, or why. We merely know that it is so—that when the summer migrant lifts her wings and sails away from her home Harbor of Elm all the bewildering array of vegetation in the world beneath and about her cannot confuse her journey. By some sure compass she comes to port on the leaf of an apple tree and on apple alone, or on

some such close relative of the apple as the mountain ash or hawthorn. There is no better botanist than an aphid. Think of it, to find *Pyrus* or *Crataegus* among all the amazing tangle of summer vegetation! She does not reason about it, because an aphid can not reason; but we do and say that we think that the sense organs on her supple antennae must receive an impression from the apple leaf. For her may there not be some whelming scent of apple leaf powerful above all the other scents of a summer day? Immune to the currant and grass and shadbush and whatsoever odors may signal related species, the fragrance of apple lures her, relentlessly, unresistingly. Thus the wisdom of man seeks to pry a very little way and feebly into the vast mystery of an aphid!

But while we speculate, the migrant, neither in haste nor hesitation, has crept from the upper side of the apple leaf to the lower and, plunging her beak into the tissue, tastes a juice hitherto strange to her. Presently her brood of young are born—all fatherless daughters, still. Without pausing to sip at the leaf of their mother's choice, the infants, so small that you need a lens to follow their trail, travel to the stem of a watershoot or perchance a tender place in the bark near a pruning-wound, where growth is vigorous and sap runs freely. The three preceding lives have grown up within the shelter of elm leaves, their mother has sought but now the shade of a new-found apple leaf. But they go forth into the sunshine—pioneers in a venture such as has not been known in their family history since, seven generations ago, a maternal ancestor did what they are doing.

From the shelter of shade into the scorching summer sun! Well, they are not descended from a magician for nothing, it seems. Presently their tent is spread above their colony—a tent of fairylike fleece. It is this canopy, indeed, that gives the insect the name by which it is recorded in the pages of economic entomology, "the woolly aphid of the apple". As you glance from the summer castle of fleece upon the apple to the deserted leafy springtime palace on the elm, you will find little enough to suggest that the self-same species of insect inhabits one for its first three lives and the other for its next three; with the way from the first home to the second spanned by the predestined wings of a migrant form.

OVERWINTERING EGG AND TWO GENERATIONS
Left, the egg, then the female of the first generation and then the daughter unto the second generation

AND NOW THREE MORE GENERATIONS DEVELOP
Number three is the spring migrant from the elm, while four and five are daughter and granddaughter found on the apple

THEN BACK TO THE SANCTUARY OF THE ELM
Number six is the fall migrant and seven shows the son at the left and the daughter who lays the egg to start the new cycle

The fluff upon the apple tree, in spite of its name, is not of wool but of wax—a wax of the fairest blue-white filaments pressed out from the wax cells within the aphid's body, through pores in its skin. Certain of these pores suggest by their shape and arrangement the petals of a flower, though of course they are so small that it requires microscopic vision to see them. The cloud

THERE ARE ENEMIES OF THE APHID SUCH AS THIS HUNGRY FELLOW

The voracious coccinellid comes to feed upon those plump creatures, sweet with honeydew, leaving discarded aphid fragments as relics of a riotous feast

of wax these aphids pile between them and the sun neither melts in the heat of a summer's day nor withers like a drying leaf, but serves as seasonable shelter and safeguard against undue evaporation.

The daughters of the spring migrant pass their hours in sipping apple juice, sucked from the tender bark to which they cling until the time of their maturity is reached. Their daughters, fatherless as the three preceding generations have been, resemble themselves in outward form and, like themselves, feed under a fluffy canopy of wax.

A serene existence—sipping sap the day long and the night long with four times a recess enough between meals to throw off a skin when it becomes too tight; and then, still sipping, to bring into the world a brood of daughters, half-orphaned like their maternal ancestors of the four previous generations. Serene and unperturbed their days, until their ancient enemies find them out. The migrant aphid had left their foes several lives before in the elm leaves, you will remember; but to what avail? Look where a two-winged syrphid with yellow bands upon her body hovers near the colony, then dips and leaves an egg from which hatches a youngster so greedy that aphids can hardly be born fast enough to appease his hunger. The dagger-beaked capsid is again at work. The coccinellids come to feed on those plump creatures, sweet with honeydew, and their scrawny broods sprawl about at riotous feasts strewn with discarded aphid fragments. The fair fluff of waxen fleece canopies serenity no longer—but slaughter. Then, too, perchance, that procrastinating giant, the apple man, wheels out his monster spray cart.

With the merciless gang of syrphid, capsid, coccinellid and man at her heels, what can an aphid do?

Well, *this:* in the sixth generation (the third to be born on the apple) there are developed two mother forms, one kind without wings remaining on the apple and giving birth to young who do not pause to feed amid the appalling dangers that surround them, but scamper down the apple trunk to seek the soil for a hibernating refuge. Also in the sixth generation are developed, besides such wingless ones, mothers with wings—the fall migrants.

You see one creep apart from the sister colony and stand alone upon the apple branch; and you know that such a journey lies before her as has not been ventured upon since, seven generations ago, a maternal ancestor took the selfsame marvelous flight. And so you watch her lift her transparent wings and sail away. Her enemies may press upon her clan fourfold or ten but she has escaped and bears forth the torch of life for her species. Those frail wings have a spread of some five millimeters, yet it is no insignificant event—that flight of hers. It takes her as far as an elm tree and it takes our thoughts still farther. You may smile if you will, but I am not ashamed to confess that I cannot see a migrating aphid poised for flight without a sense of admiration for the marvelously elaborated relation of this insect to the nature of its environment. For is not that silent, well nigh invisible journey an astoundingly incredible fact?

What pilot has she, who left the apple branch but now, to lead her to the elm? It is not her hunger that lures her forth, for, though she may be done with apple sap, nothing else hereafter will tempt her beak. Neither her hunger nor any vague hunger-call of her unborn young, for such reasons as we shall see, has anything to do with her flight. Nor is it the mating instinct that urges her on, because the fall migrant represents the sixth mother generation to bring unfathered progeny into the world.

But our perplexities are of no concern to the migrants. They cast anchor in the bark of an elm. This is their predestined port. Just as it has been a tradition for untold centuries that the third generation must take flight from *Ulmus* to *Pyrus,* so it is a custom no less ancient and binding that in the sixth generation there shall be a return to the elm. The fall migrants but keep faith with their species as they creep into a protecting crevice of the rough bark, where they bring forth their small broods of daughters and *sons.*

Yes, the seventh generation has arrived—a male heir is born to the family! I wish that I might portray him with an impressiveness due his importance. But truth compels the statement that, though it has taken seven generations to produce him, Mr. *Eriosoma lanigerum* is, after all, not much to look upon. When fully mature, he is still so small that it would take eight or ten of him to circle the circumference of an ordinary pinhead—never attaining, in fact, a size larger than his maternal ancestors were at birth. How can he attain size, indeed, when he never takes a drop of nourishment? How can he take nourishment when he has no beak? The wonder is that he goes through the motions of growing by molting his skin four times with as much formality as if it really did become too snug for him. After the fourth molt, he is of age, so to speak, and, being of age, he seeks his mate.

Now it has come to pass that the daughter in the seventh generation is not so very much larger than a son, being beakless likewise. Obviously there can be no wedding feast. The microscopic courtship is a ceremony observed with life-long fasting. But though so small an affair, it is tremendously important, because into a tiny nest of fluffy wax in the shaggy bark of the elm, the wee beakless mother tucks one egg. That egg holds her only offspring—a daughter who can boast the first father for seven generations. It is a very special sort of egg, as the egg of an aphid has reason to be. It has taken seven generations to produce it and it holds, during the dormant months of winter, the mysteries of seven lives to come —lives of fatherless birth, food quest, and homecoming.

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NATURE CELEBRATES INDEPENDENCE DAY

BY ENOCK JORDAN ROGERS

THE hours of a safe and sane Fourth of July had marked nearly half the day in an adobe village in the Indian country, not far from Santa Fé, New Mexico. Sun and cloud had striven for supremacy during the entire morning. Glorious sunshine and quiet shower had followed each other in steady succession, and an occasional cloud had dared to drip defiance in the face of the mighty Sun.

As the Indians were eating their mid-day meal, the majority of them seated upon the mud floors of their homes, an electrical crash produced the noise and excitement that Nature evidently felt disposed to contribute toward the celebration of America's Fourth of July in the home of native Americans.

A low adobe dwelling at the southeast corner of the pueblo lay in the path of the electrical current. Near the northwest corner of its roof is built a small, adobe "roof-granary" extending some three feet above the house roof—a slightly irregular line of cracked and loosened earth-roof, a few inches in width, marked the course of the electrical current, which struck the west wall of the granary, coursed slightly northward down the three-foot wall, then northwestward on the house roof for some eighteen inches, where it rounded the north edge of the mud roof, and changing direction at a right angle, passed through the north wall of the dwelling a few inches below the crude earth and brush ceiling of the living room, striking the mud floor about three feet from the north wall of the room. Two strong poles, driven into the ground at the north wall of the dwelling, near the granary and extending some feet above it, were untouched by the lightning as were also several pieces of iron, large and small, which lay nearby upon the roof. There was no appreciable displacement of adobe in the path of the electrical current during its entire course. Its exit into the hard adobe floor was marked, after loosened mud was swept away, by a hollow no larger than a man's fist.

Members of the Indian family were seated upon the floor when the crash was heard,—two were violently prostrated and were unable to rise without assistance, but there was no serious result to person or property from the electrical visitation. The Indian mother described the passage of the lightning from the upper wall to the floor, a diagonal distance of some seven feet, as "un palo de alumbre" (a pole of fire). Probably this is a fitting description.

The shock was keenly felt throughout the entire pueblo. A man walking to his corral, a long distance from the scene of the disturbance, fell to the ground and found it difficult to get upon his feet again. Others felt the shock but little less keenly. Though lacking the customary pyrotechnics and mercifully spared any loss of life, this Indian village of adobe dwellings in the shadow of the Rockies had a truly spectacular July 4 celebration.

A FRIEND TO SCIENCE

BY LEWIS WAYNE WALKER

This is another story in the series about the nature hobbies of interesting people

A SCORE of years ago, Dr. John C. Merriam's attention was drawn to some bubbling asphalt pits in the heart of Los Angeles, and the owner of these natural deposits, G. Allan Hancock, willingly gave him permission to excavate for bones. Mr. Hancock had been finding bones in the past, when the pits were being worked commercially, but as domestic cattle and small wild animals were constantly becoming mired in the tar, he thought they were of no value, and accordingly turned them into charcoal. As Dr. Merriam excavated, the remains of wondrous animals of the past came to light. The pits gave to the world the first complete skeletons of the sabre-toothed tiger, of which some five hundred specimens have been removed. The most perfect remains of the Imperial elephant, the largest land mammal ever to roam the world, was taken piece by piece from the tar.

The asphaltum deposit was highly valuable commercially, but its value to science was immeasurable in dollars and cents. Captain Hancock accordingly presented his pits to the County and its museum, on condition that the duplicate material was to be exchanged. With this clause he not only assured the people of California the findings acquired in the La Brea deposits, but brought from other parts of the world natural history objects of great value.

Although the Captain had always been interested in animal life, it is only natural that this discovery on his property should focus his interest on this study. It opened the doors to new researches of mutual benefit to both the public and himself. Several years after presenting Hancock Park to the County, he started a cruise in *Mexican Waters*, the results of which came out in a book of that title. As guests on his trip there were scientists, writers and photographers—all to carry back to the world their part in the exploration. Following this cruise, a few members of the California Academy of Sciences in San Francisco, accompanied him to Galapagos, and other islands en route, to collect museum specimens and invaluable scientific data. The movie cameras shot twenty thousand feet of the scenic and animal wonders, and this is still being used in public schools and other organizations. One of his party was the first man ever to make a landing on the almost perpendicular Island of Malpelo. Here on a cliff several specimens of a new species of lizard were collected, and these were later named in honor of the expedition's host.

"TOTO" AND CAPTAIN HANCOCK

The versatile friend of science and lover of Nature poses with his pet chimpanzee

RECONSTRUCTED FROM THE BONES FOUND IN THE LA BREA PITS

Invaluable prehistoric specimens were found in the asphalt pits which Captain Hancock has given to posterity. In the center is the skeleton of the Imperial elephant

Recently there came again to the San Diego Zoo the oft-repeated rumors of white seals on Guadaloupe. Captain Hancock volunteered his services and the use of the *Velero II* to run the rumors down. A herd of from six to ten of the albinos was found at the base of a steep, inaccessible cliff. Another trip was promptly planned with the object of bringing back alive one or two of these "freaks." This trip on his brand-new 195-foot cruiser, the *Velero III*, I had the good fortune to join, and thus became acquainted with Captain Hancock, a man of few words, but with determination to achieve his goals.

This characteristic is well illustrated in other lines besides Nature. He had no desire to just "own a yacht," the handling of which would be left entirely to others. With study he became a skilled navigator, and earned his Captain's "papers." Interested in flying, he started the Santa Maria School of Aeronautics. To do this right he felt that he must learn to fly. He did. His ownership of the Santa Maria Railroad prompted him to learn about trains, and now at a moment's notice he can take the throttle. His interest in music shows the same determination. For five years he attended the rehearsals of the Los Angeles Philharmonic. Now, as an official and artist of that organization, he knows it thoroughly from the ground up. Every undertaking is handled in a like manner, and is almost sure to be successful. He makes his hobbies a business, and his business—whether Nature, music, aeronautics, or railroads—are his hobbies.

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A CARVER OF WOODEN BIRDS BY RICHARD W. WESTWOOD

OUR recent story of the young man in New Orleans whose hobby it is to carve birds from blocks of wood, then color them accurately and thus to create a collection that, while of wood, is not wooden at all, stirred much interest. It also served to bring to our attention another whose achievements in this line are of interest and note. This is Robert S. Bowen of West Newton, Massachusetts.

A native of California but a lifelong resident of the Bay State, Mr. Bowen has always loved the outdoors and the birds. Gradually he developed from these interests an avocation, one that he felt might contribute somewhat to the conservation of bird life as well as to education. Recognizing that the law in Massachusetts limits private collecting of the skins and mounted specimens of protected birds, Mr. Bowen felt that accurate and attractive birds in wood might be made to serve many purposes.

"It seemed to me," Mr. Bowen said, "that specimens of birds, well-modeled and colored, produced in a substantial and enduring material, could be the means of disseminating a wider knowledge of bird life, and its esthetic, as well as its vital economic value to mankind.

"Possibly, the purpose could be served best by quantity production of models at a nominal price; such a procedure, however, appears to me to be impracticable. I considered the advantages and disadvantages of working in plastic materials, metal, and wood, and concluded that wood is the best material, everything considered, for the purpose of producing a first class model.

THE MALE SPARROW HAWK
And, below, carved and painted models of eight familiar birds

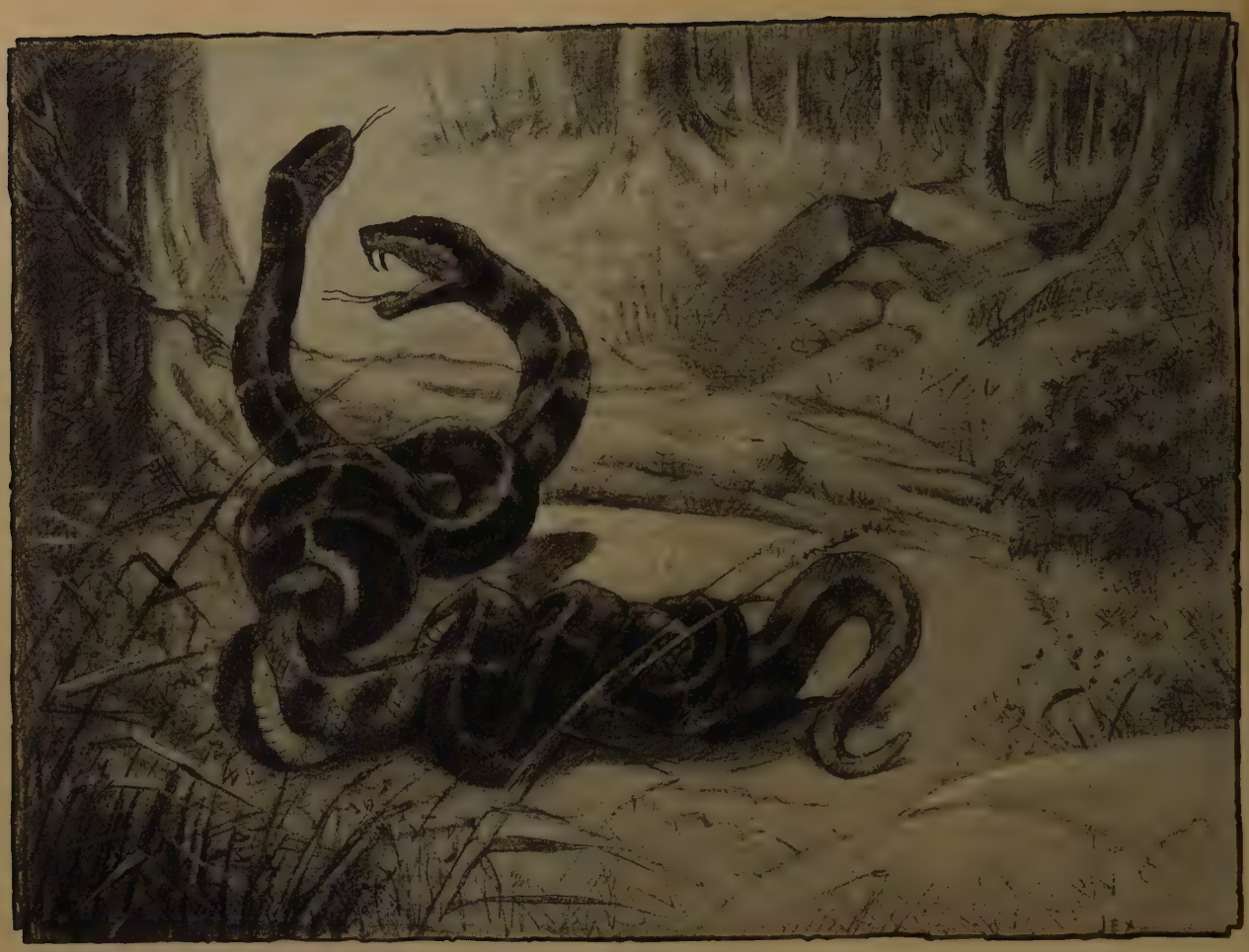
"Unfortunately, carved wooden models cannot be produced in quantity as each model requires much time, patience, and skill in its creation. Moreover, for these reasons, its production cannot be based on a popular price.

"Up to the present I have confined my efforts to models based on studies made from mounted museum specimens, supplemented by authoritative ornithological literature and colored plates.

"The body is made of soft white pine. The legs, feet, and toes are made of brass rod or wire, formed by hammering, filing, bending and soldering. Artists' oil colors are used to simulate the color markings and texture of the various parts.

"In justification of my hope that my endeavors in this line of work may receive substantial recognition, I cite the fact that the results of my efforts so far have received the indorsement and critical commendation of a number of well known artists and ornithologists."

Well done, birds fashioned of wood do offer an excellent opportunity to build up an interesting and decorative collection of bird subjects.



THE KING COMES

A DRAMA OF THE WILD WITH NO AUDIENCE

BY FLORENCE H. MOORE

Not the rustle of a leaf announced the coming of the dreaded King, feared by all his kind. A passing shadow was as noiseless, but was it instinct that held the moccasin motionless, with no enemy in sight?

Then—a long, dark body, vivid with chain-like markings of pale yellow, glided from somewhere and sprawled its length alongside, the bodies of the two snakes touching. The shining head of the intruder snuggled closer, until it seemed to caress the head of the moccasin.

While the moccasin hesitated, debating whether the king was friend or foe the lower portion of the king's body, with an incredibly swift movement, was winding its sinuous way under and around the moccasin. The reversal of tactics was so sudden it was startling, and there was something diabolically human in the daring confidence of the attacker. His gleaming eyes seemed to flash with the assurance of his claim to the title that he meant to uphold.

It was an unforgettable sight. Even as the dark head of the king nestled caressingly closer, as if still mesmerizing the moccasin into a confusion of uncertainty, the powerful coils tightened. The moccasin, aroused into superb action, struck out fiercely, his venomous fangs burying themselves into the king's body repeatedly.

For a few moments the issue seemed doubtful, for the proposed victim was the larger of the two. Then tighter grew those constricting coils, until the whole lithe length of the predator encircled the doomed moccasin. Numbed and unable to bite, it was soon strangled. Then and only then, did those tightening coils relax and the next episode of this forest drama begin.

It was a gruesome as well as a rare sight to see the attacker swallow the attacked. Long before the last coil was unwound, undaunted by the difference in size, he proceeded effectually to exterminate his foe and to gain a meal as well.

After it was all over, he lay resting, his jaws and throat again normal, but with his body distended with that of his late foe. He will move only when he is hungry again and some foolish rattler or other of his kind or perhaps some timid rodent crosses his path and thus meets destruction.

THE WHITE-TAILED DEER

THE VIRGINIA DEER AND ITS SUBSPECIES, AND THE LITTLE FAN-TAIL, OR MEXICAN DEER

BY VERNON BAILEY

• • •

DAPPLED FAWNS OF THE WHITE-TAILED DEER
They were among the most beautiful, graceful and affectionate of wild animals

THE white-tailed and fan-tailed deer of North America form a variable group of species and subspecies over most of the United States and parts of Canada and Mexico. They are smaller than the Rocky Mountain mule deer and very different in appearance, habits, and structure. They have the single curved-beam antlers with erect prongs, relatively small ears, wide bushy tails, and small but conspicuous glands low down on the outside of each hind leg. They lack the white rump patch of the mule deer, elk, mountain sheep, and antelope of the open country, but are not lacking in conspicuous directive markings. When the tail is down, the plain gray, or in summer reddish brown, coats are inconspicuous and often render the animals quite invisible when at rest, but when they are alarmed the tail is thrown high, spread wide, and its pure white lower surface shown flag-like as the deer bound away through the woods or brushlands. In fact, the high arched leaps often show the whole white under surface of their bodies while in the air and startle the beholder by series of great white flashes. In brushland, or in the dusk of evening, the white is sometimes all that can be seen, and even by moonlight you may see these waving white banners go soaring through the woods like ghosts, several in line, following a ghostly leader.

This is another article in the group being prepared specially for NATURE MAGAZINE by Vernon Bailey, Chief Field Naturalist of the United States Bureau of Biological Survey. The articles of this group have outstanding permanent value and deal with the life habits and distribution of our larger North American mammals.

For semigregarious animals, often in small groups, or in the case of two fawns following an old doe, this directive color marking is of evident value. It can be used at will or concealed, as is sometimes done by a single deer, running low with tail down and disappearing in the gray forest as if by magic. Again I have seen one deer of a scattered group of three, while standing still watching me at a distance, raise its tail straight up, spread the long hairs wide and wave it from side to side like a white signal flag, repeating the motions several times with the evident intent of attracting the attention of its companions.

In the open, on good running ground, these deer have no fear of any four-footed enemies, as their speed is ample protection if a fair start is granted. The big cats get them, however, by stealth and a sudden spring, and the wolves and coyotes catch them on a crusted snow or glary ice, or pick up the young fawns when the mothers are not near. The deer have good reason to be timid and wary and to develop high speed and long endurance. No weaklings survive.

The antlers of the bucks are shed each year late in winter, and a new set grows during the summer. At first these are soft velvet-covered knobs where the last year's pair dropped off, then they elongate into curved beams and erect tines until the whole set is completely formed and gradually hardened into tough, springy horn tissue. Early in autumn the old dry skin, still covered with short soft velvet, peels from the horns, which are rubbed and polished on small trees until smooth and sharp and ready for the test of who shall be lord of the herd during the mating season of November.

Usually the white-tails are less gregarious than the larger deer, and the does are not gathered in herds or harems, but under normal conditions most of the breeding is from the largest, most powerful, and vigorous old bucks. The younger, weak and undeveloped bucks rarely pass on their characteristics to future generations until old enough to prove their powers in open battle.

IN YELLOWSTONE NATIONAL PARK
In winter the thick gray coat is so impervious to cold that the deer sleep comfortably on the snow

Since the early colonial days, these best known and most abundant and widespread of our North American deer have been generally considered the most valuable game animals of the United States. They furnished food and clothing not only to the native people for ages back but to all our own people in the days of early settlement.

In Virginia, where our deer was first described and named in 1784, these animals still cling to the swamps and canebrakes and densely wooded bottomlands in numbers sufficient to afford good hunting. In purely agricultural areas and densely settled parts of the country they have disappeared before intensive hunting and cultivation of the soil, but in rough, timbered, or waste land they still hold their own where given adequate protection, and in some favorable areas have become so abundant as to threaten their own destruction by starvation.

In habits as well as appearance white-tailed deer are quite unlike the mule deer of the Rocky Mountains and open country. They are secretive and seek the cover of forests and thickets where they can hide away during the daytime. In New Mexico the Taos Indians call them *Pahumana,* the *"stream deer",* because they hide in the willow thickets along the streams. In places they go high in the mountains in summer, but always in the timbered or brushy country, and before the deep snows of winter can shut them in they drift back to the valleys and generally to the bottomland thickets. In the northern part of their range they generally go into the swamps in winter, and by tramping trails in the deep snow are able to get food in the shelter of these dense evergreen forests of hemlock, cedar, spruce and fir. If the swamps are extensive and food is abundant they live comfortably in these "deer yards" until released by the heavy crusts of spring, or the melting of the snow, so they can reach the warm hillsides with bare ground and fresh forage.

IN WESTERN NORTH DAKOTA
The buck has full-grown velvet-covered antlers in September and all are still wearing their thin summer red coats

The natural food of these deer in winter is browse, the leaves, buds, twigs, and bark of trees and bushes, with the addition of such lichens, moss, and ground vegetation as they can paw out from under the snow. When the food runs low they browse the branches of the trees as high as they can reach by standing on their hind feet. The larger deer can reach up a full six feet or a little more, but the young deer can get none of this last food supply and frequently as the "deer-line" gets higher and more clearly marked, the last year's fawns and small deer starve and even the largest deer become poor and weak before they can get out of the deer yards to reach a fresh food supply. In many such cases it would be an easy matter to slash down a few of the less valuable types of trees to permit the deer to feed on the buds and twigs. Poplar, birch, and alder would supply good winter browse and never be missed from the forest, or a few branches could be lopped from the hemlocks and cedars to carry the deer through a time of shortage.

The natural food of deer in summer includes a great variety of leaves, twigs, buds, flowers, seeds, and green plants. Clovers, wild-pea vines, and many other legumes, pigweeds, and dandelions are their favorite foods, but they eat very little grass at any time. Their delicate noses, flexible tongues, and keen-edged lower incisors are well fitted for dainty browsing and picking, and most of their food is of the choicest kind.

In autumn deer hunt for fallen nuts, acorns, grains,

and seeds of many plants, and with such rich foods they generally start the winter with ample layers of fat inside their skins and a boundless supply of strength and vigor.

In the pioneer days of our country fat venison was the great dependence and luxury of the hardy settlers on the frontier, and few now realize how these deer, as well as the buffalo and the beaver, helped to carry our border line of settlement across the continent. Then the boy became a man when he could handle the old muzzle-loading rifle and bring home the venison, and he got the training and skill that made our country respected at home and abroad. Now there is little need for this training, but the old hunting spirit still clings to many of us and possibly may never be entirely eradicated. It will go faster, though, when we get more intimate knowledge of the lives of such animals, and especially as we get closer to them and feel their trusting confidence.

Much of the success of these deer in holding their own against all enemies, including man, is due to their intelligence, caution, secretive habits and great speed. They soon learn where danger lurks and are quick to recognize any safe cover or refuge. They are skilful in thwarting the hunter, but quick to give their confidence to man and to accept his offers of food and protection. Many a lonely woodchopper has made friends with deer through the winter and fed them bread crusts, and apple and potato parings at his cabin door, much to his own delight, and to their pleasure and advantage, for it gives them security.

In the few National Parks where deer occur they soon become friendly and will often come to an extended hand, confidently expecting some dainty morsel of food. Taken young and carefully tamed they are beautiful and affectionate pets, but when the bucks get their full grown antlers they are dangerous as long as the hard horns are carried. The fighting frenzy that goes with the new horns and the swollen neck of the rutting season gets beyond their control and renders them unsafe even with their best friends. When the horns are shed and while the soft velvet-covered new horns are growing the bucks are as gentle and quiet as the does and fawns, and even friendly with each other. While the does are devoting their care and strength to their young the bucks seek the high ridges or the lake shores, where, free from insect pests, they slowly nourish the antlers that will later determine their social standing.

IN HIGHLAND COUNTY, VIRGINIA
This old doe is still wearing her faded gray winter coat well into April

The type localities and general distribution areas of the subspecies of the Virginia deer and the little Mexican fan-tailed deer are shown on the accompanying map, but the group has not been thoroughly worked up and in its final study these ranges may be considerably modified. For the present they are the best that can be given. All of the United States whitetails, except the Arizona fan-tail, are treated as subspecies of the Virginia deer, as all, with the possible exception of the Florida island deer, seem to show intergradation and to represent only geographic races.

The Mexican and Arizona fan-tailed deer represent a distinct group with other forms farther south that are not included. The little tropical brockets and mazamas of still farther south are not included, as they are largely of South American origin, and of a distinct type.

Virginia Deer. *Odocoileus virginianus virginianus* (Boddaert). 1784. A rather small, dark gray and dusky deer with slender muzzle. In summer coat rich tawny. The *type* region is generally considered in the vicinity of Jamestown, southeastern Virginia.

Northwestern White-tailed Deer. *Odocoileus virginianus borealis* (Miller). 1900. A very large brownish gray deer with much black on top of tail; summer coat bright tawny. Skull long and narrow. *Type* from Bucksport, southeastern Maine.

Florida Deer. *Odocoileus virginianus osceola* (Bangs). 1896. A rather small, dusky gray deer with very long, slender rostrum; summer coat rich tawny. *Type* from Citronella, west-central Florida.

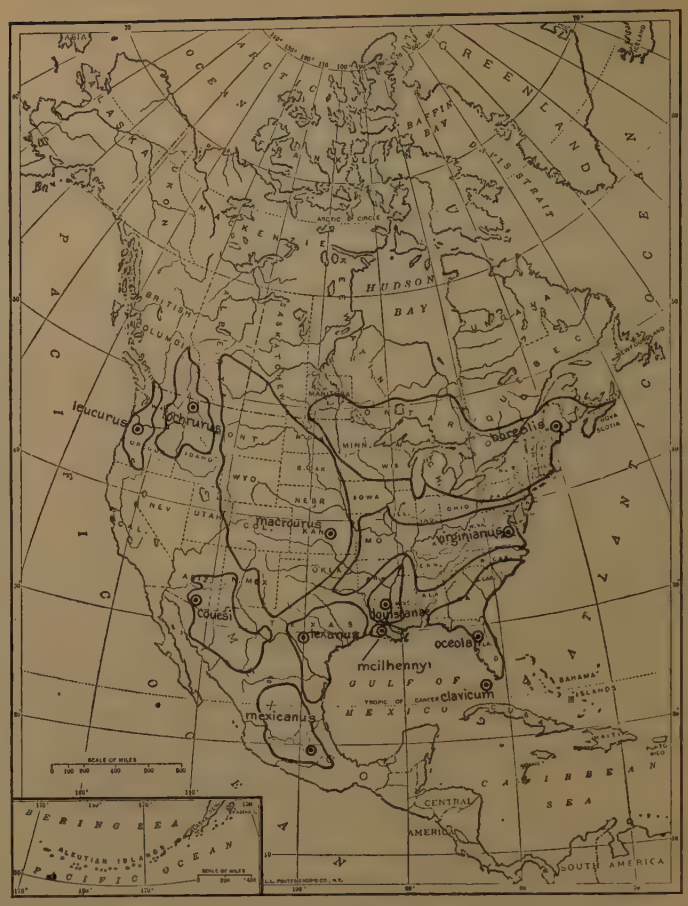
Florida Island Deer. *Odocoileus virginianus clavium* (Barbour and Allen). 1922. Smallest deer of the United States, dull buffy gray with dusky nose: summer coat not noticeably different. *Type* from Big Pine Key, Florida. Found only on the outer keys off southern Florida.

Louisiana Deer. *Odocoileus virginianus louisianae* (G. M. Allen). 1901. A very large deer with heavy skull and very large, rough antlers. *Type* from Mer Rouge, Morehouse Parish, Louisiana.

Louisiana Coast Deer. *Odocoileus virginianus mcilhennyi* (F. W. Miller). 1928. A small deer about the size and color of *virginianus* but with heavier dentition. *Type* from Avery Island, which is not an island but a timbered area on the big coast prairie of southern Louisiana.

Texas White-Tailed Deer. *Odocoileus virginianus texanus* (Mearns). 1898. Slightly larger than *virginianus,* with shorter, heavier skull and heavier horns. Color paler gray in winter, and lighter tawny in summer. *Type* from Fort Clark, Kinney County, southern Texas.

Plains White-Tailed Deer. *Odocoileus virginianus macrourus* (Rafinesque). 1817. Size large, skull long and narrow. Colors pale buffy gray in winter, yellowish in summer, much white below and a long bushy tail; top of tail dusky. *Type* from the plains of Kansas River, Kansas.



MAP SHOWING APPROXIMATE RANGES OF WHITE-TAILED DEER, TYPE LOCALITIES INDICATED BY THE CIRCLES

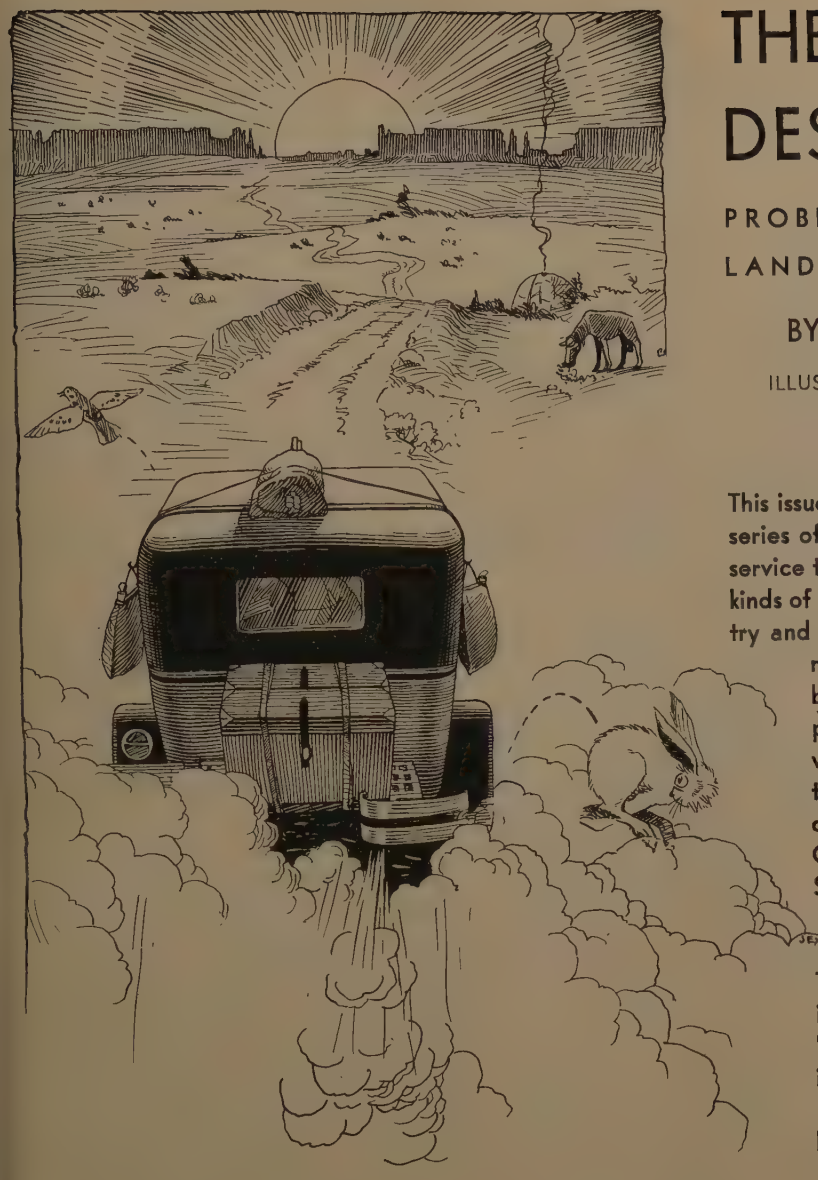
A buck with antlers fully matured in October when the keen points are dangerous weapons if brought into use against any foe

Yellow-Tailed Deer. *Odocoileus virginianus ochrurus* (Bailey). 1932. Larger and heavier than *macrourus;* not so pale in color; not so dark as *borealis,* and top of tail clear yellow in winter coat; summer coat light tawny. *Type* from Coolin, northern Idaho.

Columbia White-Tailed Deer. *Odocoileus virginianus leucurus* (Douglas). 1829. Size small and slender with light skull and horns. Colors brownish gray with much white; summer coat reddish brown. *Type* locality. Falls of the Willamette River, Oregon.

Mexican White-Tailed Deer. *Odocoileus mexicanus* (Gmelin). 1788. A very doubtful name based on a pair of abnormal antlers ascribed to Mexico.

Arizona Fan-Tailed Deer. *Odocoileus couesi* (Coues and Yarrow). 1875. A very small deer with small horns, short wide skull, small teeth, large ears, and bushy tail. Color in adults, light gray at all seasons, tawny in young only to the second summer. *Type* from Old Camp Crittenden on east base of the Santa Rita Mountains, Arizona.



THE CALL OF THE DESERT SPACES

PROBLEMS OF CAMPING IN ARID LANDS AND HOW TO MEET THEM

BY ARTHUR NEWTON PACK

ILLUSTRATIONS BY JEX AND THE AUTHOR

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This issue of Nature Magazine inaugurates a new series of articles and a new department to be of service to readers. The articles will discuss various kinds of camping in different sections of the country and problems of proper clothing and equipment. Information of this nature has never before been presented in such a simple, practical manner. This first article is devoted to motor camping and, more particularly, to the delights and problems of camping in the deserts of the Southwest. Other articles will include: "Shelter and Sleep in Camp—A Standard Outfit of Tents and Bedding for All Sorts of Camping"; "Outfitting for a Pack Trip with Horses in the Northern Rockies"; "Outfitting for a Canoe Trip"; "Outfitting for the High Sierras"; "Hiking and Camping in the Appalachians."

All inquiries regarding camping problems will be gladly answered by the Camping Editor of Nature Magazine.

As THE FIRST signs of spring creep up from the South every true lover of Nature begins to dream—perhaps of the lake- and stream-dotted wilds of the north country, perhaps of the great Rocky Mountains turreted and bastioned against the sky, or perhaps of the long, dusky sunset shadows of the desert where man may survey the universe with awe and meet there his own soul. Alas that the charm which may lure us most strongly is often far away—or, perhaps, that is part of the charm itself. The very remedy for that restless urge may be to analyze it and reduce it to concrete proportions fulfillable when summer draws on and vacation time is at hand. There is always the train time-table or even the airplane schedule, either good for covering long distances, but nearly everyone dreams some time of the advantages of having his own automobile to poke about into little suspected crannies of the great wilderness.

For the automobile traveler and camper whose main interest is to go to as many places as possible without seeing them, whose main object in life is movement and yet more movement, we have no sympathy. The automobile may be used properly as an inexpensive and comfortable method of transportation whereby two or more persons properly equipped and willing to camp and do their own cooking can travel across the country at a cost far less than by any other means of travel and almost more cheaply than staying at home; or it may serve as a base from which side trips may be taken by foot, horse, or canoe. But there are places where the automobile, properly used, comes into its own and offers the most practical key to proper travel in the wilderness areas. Such are the great deserts of the Southwest—the Bad Lands of the Dakotas and Montana, the Indian country of New Mexico, the great and practically unspoiled Navajo Indian country of northeastern Arizona, and the by-ways of the Colorado and Mohave Deserts still farther west. No man has really seen America until he has seen its desert regions. He has never seen its desert regions until he has followed some faint track that cannot possibly boast the name of highway; until he has slept there under the stars, and known the magic of the sunrise. Thenceforward for all his life that strange charm

"IF THE CAR DOES NOT GET STUCK AT LEAST ONCE, WE MAY COUNT OURSELVES LUCKY"

will follow him and, like homesickness, will call for a return.

To travel across country by automobile is today a simple problem. There are good roads nearly everywhere. There are reasonably priced clean automobile camps, as well as many dirty and disgraceful ones. For such travel one has to take only the car and one's personal belongings. But it is still less expensive and probably more pleasant to camp independently. East of the Mississippi there are few good camping sites on the main routes, but there are always the side routes that take one into the mountains of the Southern States or northward into the lake-dotted regions of Michigan, Wisconsin, and Minnesota. Once the Bad Lands are reached, the camper may be as independent as he pleases. Only let him leave the main road and wander in his car with a good map, and the world opens before him. Here, however, he meets for the first time a real camping problem. He must learn to be a dry camper, abandoning all idea of finding a rippling brook to rest beside. If there is such a brook, its water is probably alkaline and undrinkable, or a few hours after the rain storm it may dry up. One selects a camp site with an eye to protection from a possible wind, but, beyond that, he chooses only that which appeals to his esthetic sense. Water is in tanks in the car. Cool water for drinking is in the water bag which hangs in the breeze. Reasonably cool food is in a container covered with dampened cloth, the principle of evaporation acting in this case much the same as for the water bag. Of course, one has to save water and not be wasteful, but that is a habit soon acquired, and the time may come when it will seem quite natural to wash in the left over dish-water and then, perhaps, pour even that into the radiator of the car. However, such eventualities do not occur except in emergencies. It is quite easy to carry five gallons of water in a tank on the running board of the car or inside, and that is ordinarily more than sufficient for use between good watering-places.

Now let us consider that we have a five-passenger automobile and desire to wander into such a wilderness as the Navajo country of Arizona, where camping is the only way to get through. There are two of us, or maybe three. A trailer to carry our extra baggage may be all very well on good roads, but a trailer switches from side to side on steep grades and encourages skidding. In the real desert country where sand comes deep, and sharp dips into dry stream beds are frequent, the trailer is a menace. We shall rather try to load everything we need into our car and if the party grows too large we had far better take two cars. The first thing to do is to have the rear springs built up by an expert spring-service shop to care for the additional weight. At the same time we should have eyelets and strap fasteners firmly fixed on the roof, so that we can fasten there such things as tents, which are meant to stand the weather anyhow. On the right-hand side of the windshield, or, if no one is to ride in the back of the car, opposite the rear window, we have a strong steel hook put into the frame. A good idea is to have a steel rod stretching across the roof of the car and firmly fixed to it with a hook which extends on either side. These hooks will do to hold our heavy water bags, which are porous and, if hung in the breeze, will keep part of the water cold even in the hottest weather, through evaporation.

We should have a large strong trunk rack on the back of the car, but most automobile trunks are of some-

what awkward shape for packing odds and ends. Perhaps a better thing to do is to make two narrow wooden boxes which can be firmly fastened to the trunk rack. These boxes are about 2 feet long, 17 inches high, and 8 inches wide, and fit one behind the other on the trunk rack. We can make them of wood, cover them with canvas glued on, and paint them so that they will be entirely waterproof. Into these boxes we put our two-burner gasoline stove and folding oven, our cooking outfit of pots and pans and cups and plates nested together, a short shovel, an ax, and a light steel tow rope. We are not relying upon good roads in the wilderness or desert country, and we may need the tow rope, as we shall most certainly need the shovel—if for nothing else than for burying our empty cans. There will be room in the boxes for some food as well—canned goods, sugar, flour, corn meal, and such staples—tied tightly in waterproof bags holding a pound or two apiece. We do not have to carry a great deal of food, as our supply can be replenished at Indian trading posts, where we also get gasoline.

"WE MAY UTILIZE THE SPACE BETWEEN THE FRONT BUMPER AND THE RADIATOR OF THE CAR"

Most people camping across country load up the running boards of their cars with extra gasoline and water tanks, refrigerator boxes, and so forth. In the real desert country there are drawbacks to this plan. After a rain storm the dry creek beds will not be dry. Of course, one hesitates to cross them when they are in flood, but if they are not too deep the car will make it. Anything extra on the running boards will be a handicap, and, besides, will be soaked with muddy water. However, it is generally all right to take a chance and carry here a running-board outfit which will hold from three to five gallons of water and a gallon of gasoline for the stove. If we plan to put anything very high on the running board, it may be that the doors of the car will not open.

We still have a lot of stuff to stow somewhere, and, of course, there is the back seat of the car. The back seat proper is made up of two cushions, one the seat and the other the back. Both are deep and heavy. We shall dispense with them at the start by taking them both out and leaving them at home. If someone has to ride in the back, we can build up a good seat with our camp bedding. First we lay down an air mattress or some air pillows and then, on top of that, we lay a couple of rolls of bedding. More bedding will make a reasonably comfortable back, at least for one person, and thus, without taking up any of the room not filled before we took out the cushions, we have provided space for three or four bed rolls, some canvas tarps, and our air mattresses. In the back of the car, of course, will go our suitcases with personal belongings, and our cameras and odds and ends, but we can probably still save room for at least one person.

There have been various arrangements to make a small automobile into a bed for two people, but most of them are not altogether satisfactory, requiring the unloading of the car and a great deal of inconvenience. Most of the time in the desert we shall be quite sure that it isn't going to rain, and we can simply lay out our beds on the ground. However, if one likes the protection of a tent, he can carry on the roof of the car an umbrella type tent big enough for four people, with the poles for putting it up. Or, if we have an all-purpose tent outfit, as will be mentioned in a subsequent article, that can also go on top. We now begin to see why the car needed extra spring attention; but still, if we have been careful, we have not unduly overloaded it for the purpose of carrying two or three people over heavy roads or up very steep grades, such as we shall surely encounter.

There is one more item that will come in very handy for camping, and that is some sort of a table. We may buy and take along a folding table with a rolled up top, such as may be purchased from several dealers in camp-

IN DESERT TRAVEL THIS IS QUITE APT TO HAPPEN

Marooned in the midst of the silty waters of an usually dry stream bed for the moment transformed into a torrent by the appearance of a sudden deluge from the clouds. And a big car is no help here

er's outfits, or we may utilize the space between the front bumper and the radiator of the car, so as to have a place to set our dishes clear of the ground when meal time comes around. It is simply necessary to make a board arrangement which will fill in the waste space between the front fenders, the bumper, and the engine radiator and to fasten it down tightly with clamps or wire. Of course, such a table cannot be made absolutely permanent, as sometime we may have to remove it to crank the car.

The real trouble with modern passenger cars for wandering into the wild places is that they have been built progressively lower until their road clearance is insufficient for some of the rutted tracks that may be encountered. One safe bet alone remains, and that is a little light truck of the so-called "pick-up" type. It costs about $500.00, but it has the road clearance and the power to go almost anywhere. One can get a "pick-up" truck with an inclosed cab like a coupe model car and an inclosure for the truck body, either of the covered wagon variety or a fiber top with wire sides. It is a good idea to have an inclosure that will lock up, because sometime when we are stopping in a big city we shall want to leave our duffel safe in the parked car. With such a truck, it is possible to take a very complete outfit. Of course, it seats only two people in front, or three at a pinch, but one solution of the problem is to lay out the air mattresses and bedding either between the duffel or on top of a row of standardized duffel pack boxes in the rear of the car and thereby make one bed wherein the cramped third member of the party may take refuge by lying down or even sleeping en route.

The subject of tents and bedding will be covered more in detail in another article, but we should consider the question of clothes and other items. For camping in warm regions there is nothing better than dark-colored cotton shirts and blue jean trousers, worn by man and woman alike. The whole outfit can be bought from a mail order house for next to nothing. In the fall and spring months in the high deserts it is sometimes cold, and we may get up into the high mountains where at least one suit of light woolen underwear will be appreciated. Otherwise, we are dressed for summer. We have no use for boots but wear light rubber-soled shoes, unless we expect to go into the cactus country of Southern Arizona and California. There we shall need a pair of high leather laced boots, but we shall be careful of two things—first, not to get them too heavy for comfort, and, second, not to have them of very soft oiled tan leather through which the cactus spines may easily work. Such boots are also a protection against snakes, which sometimes may be encountered. Snakes, however, are generally found somewhere near a waterhole, and if one is careful, there is no danger from them. I have slept out in the desert under all kinds of conditions and have never had a snake try to get into bed with me or disturb me in any way. Most snake stories are grossly exaggerated. We shall probably want a coat of some sort with many pockets, like a hunter's or a fisherman's coat, or a cruiser's shirt as it is called. We shall have at least one complete change of everything and two or three changes of socks, underwear, and shirts. Borrowing a leaf from the westerner, we shall use his type of broad-brimmed felt hat for protection from the desert sun.

When it rains, it rains very hard. The best type of rain protection is something in the nature of a rain suit of light oiled silk. We can take along a summer parka with hood to keep the rain out of the back of our necks when changing a tire. This article of clothing can be secured from C. C. Filson in Seattle. We can also have a pair of oiled-skin slicker trousers. However, practically anything that is rain-proof is also nearly air-tight and will be very warm. If we get wet in the desert, we shall

YOU HAVE NOT REALLY SEEN AMERICA UNTIL YOU HAVE SEEN THE DESERT

And you have never seen the desert until you have followed some faint track which cannot possibly boast the name of highway; until you have slept there under the stars and known the magic of sunrise

soon get dry again. We do not have to be burdened with overcoats, either, unless we wish. When the nights become cold and we are still driving, we can put on a warm sweater and over it the parka which is the most effective wind-break known. We can wrap our knees in the bedding which we have with us.

There are so many miscellaneous items that one is apt to forget—toilet articles, medicines, soap, towels, mirror and wash basin. One can buy a very good collapsible rubber wash basin which takes no room at all. Dark glasses will be appreciated by all motorists in the barren countries. Mosquitoes are one thing we do not have to concern ourselves about ordinarily in the desert, but once, camping on the edge of an irrigated section, we were nearly eaten alive. If our tent has a mosquito netting, and if we take along a little mosquito dope, we are safe.

Food that will keep in hot weather is always something of a problem, but canned goods are safe. Canned butter can be purchased in one-pound tins through S. S. Pierce & Company, of Boston, and through several camp and trail supply houses in the West. It will keep a long time and even if melted will re-solidify in an unopened can. Fruits are, of course, greatly appreciated in the desert. One may crave the sound of ice tinkling in a glass, but ice is hard to get. The best thirst quencher for hot dry climates is hot weak tea. Such is the rate of evaporation from the body that cool water can not be assimilated rapidly enough but hot tea will do the trick. A stop at noon to boil tea becomes the regular habit of the experienced desert traveler, whenever possible. The gasoline stove is, of course, indispensable. Another good point to remember is that food can be kept reasonably cool without ice, if it is placed in a container, covered with wet cloth all around, and hung in a current of air.

Every camper should some day try the desert; wander on the roads which are no roads at all and where his car makes perhaps fifty miles a day. There will be sunrises and sunsets which he will never forget. There will be glimpses of Indians still living as they did so many years ago.

But know that the desert is hard and stern. It brooks no mistakes. Cars have been lost by being caught in some narrow canyon during a cloudburst, and one learns to make camp only on a comparatively high place or close to the source of a watercourse. But civilization has crept in enough to make motor travel possible. There are Indian trading posts, not too far apart, where one may get gasoline and water. Still one may travel a whole day or days without seeing another car. One hard and fast rule is never to pass any place where gasoline may be purchased without filling our tanks. It may be a long way to the next place. The best available road maps of the desert regions of Arizona, Nevada, and California are published by the Automobile Club of Southern California at Los Angeles, and may be procured from that source. There are roads of a sort, with tremendous grades and sometimes shifting sand. If the car does not get stuck at least once, we may count ourselves lucky. But we have a shovel, and, if we let the air nearly out of balloon tires they will have greater traction and not cut in so deeply. It is a wise policy to carry some extra canvas strips or tarps to put down ahead of the wheels when trying to get out of deep sand. It is also wise to carry a good tire pump to re-inflate tires which have been let down for the purpose above mentioned. Best of all is to have two cars in the party. Then one can go ahead while the other stays far enough behind to be safe and ready to pull out the leader if he gets stuck. All this is part of the adventure. Each difficulty surmounted becomes a triumph for modern man who finds himself still capable of grappling with Nature and coming out a victor in the struggle. This gives the charm to any real camping.

FOXY STAYS BEHIND

A SPARROW LEARNS TO LIVE BY ITS WITS

BY ADA CLAPHAM COVAN

Foxy came to us on June eleventh, nearly two months after the departure of his kin for their nesting grounds near the farthermost shores of North America.

A flash of henna-red flamed for just a second against the protective shrubbery. Could that have been a fox sparrow drinking from the old dripping pan? A branch stirred slightly, then cautiously. The leaves were pushed aside and a fox sparrow, with an oddly drooping left wing, stepped into the clearing.

How marvelous are the ways of Nature! Robbed of his powers of flight by an injured wing, instinct had taught the little fellow a new way to protect himself—the way of the grouse and quail—to become a part of his surroundings. Unerringly, when I disturbed him, he had selected the shelter that best matched his coat, and this natural shrewdness had kept him safe until the injured wing healed. By then hiding had become more natural for him than flying, because I soon discovered that he could fly both strongly and well.

Fox sparrows rarely sing alone, although the springtime song thrown on the air by a flock of these handsome songsters is a thing to delight the most critical ear. By June the birds and their song have long been gone, so I was astounded a few days later to hear a gorgeous burst of melody bubbling from the throat of the lonely stray. The only other bird in sight was a female song sparrow intent on getting her breakfast. On a low branch just over her head was Foxy. His eyes were fastened on the demure little lady and he was pouring his heart out in such a rarely lovely song, that it held me spellbound. For fifteen minutes the anthem continued, then suddenly stopped, and I noticed that the song sparrow had disappeared. Later in the day the delicious music again burst forth. Strangely, the song sparrow appeared at that same moment.

For three weeks this remarkable courtship continued. There can be no doubt that the two traveled together, for a friend saw them on a farm nearly a mile from us.

One day the song sparrow came alone—and the next day, and the next. She seemed ill at ease and stayed but a short while. Perhaps the black cat lying in wait behind the stone wall could explain the disappearance of our Foxy. Alone, and far from his own kind, he had given his heart to the only little friend who would bear him company. After all, perhaps the black cat's way was best.

TREES BECOME LARGE GLORIOUS BOUQUETS
Here we have the effective use of the Japanese flowering crabapple with its single pink flowers

TREES TO GRACE THE GARDEN

BY ROMAINE B. WARE

A GARDEN without trees lacks one of Nature's most charming graces. They add personality to the garden. In summer their swaying boughs become homes for the feathered songsters we love so well. In fall their gorgeous foliage is a fitting climax to the garden's year of color. Winter finds them stark and bare but filled with promise of the spring to come.

Trees give the garden poise; they lift it out of the commonplace. A landscape without them becomes a weary waste; clothed with trees its friendliness expands a thousand fold. Trees add to the livableness of the garden. They hide the objectionable view and frame the pleasing vista. They become a background for flowers and shrubs and give scale to the picture as a whole. Where winters are long and cold, trees add much to the charm of the landscape. Evergreens are especially valuable, but deciduous trees, with their colored bark and curious twig and branch formation, are likewise interesting. Both offer ample field for decorative works.

Trees may also be enemies of the garden. Too large, they crowd everything else out. Casting too much shade, the ground beneath their boughs becomes a serious problem. Their greedy, far-flung roots are as a robber band seeking all they may devour. Too many trees preclude all other plants and cast a shade so dense that dreariness and gloom pervade the air. So trees, which play such an important rôle in the garden, must be chosen with no small degree of understanding.

Trees vary as do people. Size, shape, habits, color, texture and adaptability are all factors in their selection. The stately vase-like American elm, which has been called "Queen of American Trees," proves ideal in many situations, but where space is limited, it is entirely out of place. The average yard can ill afford to devote to one tree the immense space an elm demands as it approaches maturity. To the novice, it is difficult to anticipate the

THE STAR MAGNOLIA BLOOMS
It is among the earliest and most showy but never gets to be very large

eventual demands upon limited garden space when planting a young tree.

Beech, sweet gum, linden, most of the maples and oaks, some of the horse chestnuts and many others are frequently taboo in small gardens due to their size, but there is still a wide variety from which we may choose and among them are found many extremely desirable species. Scores of flowering trees and many with showy berries are quite moderate in growth. Dogwood in several varieties, the flowering cherries and crabs, the fringetree, Japanese lilac, redbud, shadblow, hawthorn, mountain ash, sweetbay and numerous others are among the many available for garden planting.

Trees are used in the garden for various reasons and good landscaping entails planting for a definite purpose only. All too often home owners decide they "must have a tree" and so a "tree" is bought and planted with little thought as to its being a suitable variety for the particular location or use. Where the garden maker is not familiar with trees and does not understand their proper locating, he will be well repaid by consulting someone of experience. A landscape architect, an experienced nurseryman or a professional gardener will be only too glad to advise. A flowering dogwood might be ideal where an oak would be out of place; Japanese lilac will fit locations where a maple would be entirely too large.

In the front yard trees are used for shade and ornament, but never should scattering specimens be planted here and there simply to show them off. Where width of lot permits, trees, either singly or in groups, depending upon space available, may be planted at either side and a little in front of the house. Avoid planting pairs of specimen trees, one on either side in the center of the front lawn areas. Such plantings are as bad taste as the round beds of cannas, salvia and coleus so common in front yards a few decades ago. Sometimes a single specimen tree can be planted in the front yard but its location should not be right out in the center of the lawn; rather place it to one side and well back toward the house.

To the rear, where today we develop outdoor living rooms rather than "back yards" of our grandmothers' time, trees serve a different purpose, and here, too, we keep the center open and avoid

JAPANESE LILAC OR TREE LILAC
When this ornamental attains age and size it blooms bountifully. It is hardy even in our coldest sections

COURTESY A. E. WOHLERT

THE JAPANESE ROSEBUD CHERRY
It blooms early and is one of the most popular cherries, reaching a size indicated here

scattered plantings. The sky above becomes a ceiling for our outdoor living room and around it we build walls of green by planting shrubs and trees. Where space permits we may have a little separate alcove or room over at one side by planting a specimen tree and locating garden furniture in its welcome shade.

An important requisite of the outdoor living room is privacy and to insure this we make tall screen plantings. In the small garden, however, care must be used to select kinds not demanding too much space. A large variety of shrubs are useful for screens and where height without breadth is needed, columnar trees are available. Among the most popular for this purpose are the Lombardy and Bolleana poplars. Many of our common trees have produced pyramidal sports and among them we have narrow upright forms of elm, maple, birch, hawthorn, linden and oak. The poplars are by far the most generally used, although some of the evergreens are almost equally good. Arborvitae, cypress, yew, fir, juniper, spruce and hemlock all come in either columnar forms or may be kept so by a little shearing.

Care must be used with almost all trees to avoid planting where their roots will rob and starve adjacent plants. Arborvitae, yew, hawthorn and cypress are seldom troublesome in this respect as they generally root deeply. One solution of the problem of greedy roots is to dig a trench three to five feet deep between the tree and other plants and place in it, standing edgewise, a couple of sheets of heavy tar-paper. This serves as a sort of a wall, keeping the roots within bounds and it has been found that tar-paper lasts many years. This scheme is very useful where hedges with wideflung roots are the background of flower borders.

When choosing trees to beautify the outdoor living room, keep in mind their relationship in form, shape and size to the space they will ultimately occupy. Avoid plantings that will screen out pleasing views as carefully as you plant to blot out the unsightly. Any reliable grower can tell you approximately how large certain kinds will grow and how soon they may be expected to attain mature size. It is really surprising how quickly a small nursery-grown tree "grows up" in the garden. It is set out, a lean six-foot specimen and in remarkably few years it is twenty feet tall and almost as broad.

THE CHINESE FRINGETREE
Planted to have a background of evergreens, this tree will make a striking picture

Trees develop just like children, very fast in youth and more slowly as adult stature approaches.

Frequently one is urged to develop the utilitarian side of the garden by planting nut and fruit trees rather than ornamentals, and in some cases this is entirely practical. Many delightful gardens have been built around picturesque old apple trees, but a young apple tree, especially if properly pruned to produce profitable crops, is hardly as artistic. Almost without exception, fruit trees must be sprayed regularly if their fruit is to be worth harvesting and few home gardeners are properly equipped or will take the trouble to do this.

THE FLOWERING DOGWOOD

Both the pink and white forms of this ornamental are lovely and the leaves color brilliantly in the fall

Apple, peach, cherry, plum and pear trees are beautiful while in bloom but compared to the much longer lasting beauty of the dogwoods, hawthorns, Japanese flowering cherries and crabs, the gorgeous magnolias or the rare and beautiful Franklin tree, their inclusion in the ornamental planting is hardly justified. Once you have witnessed the ethereal exquisiteness of the Japanese weeping or rosebud cherry, whose blooms generally last ten days or more, you will hardly care to devote limited space to apple trees.

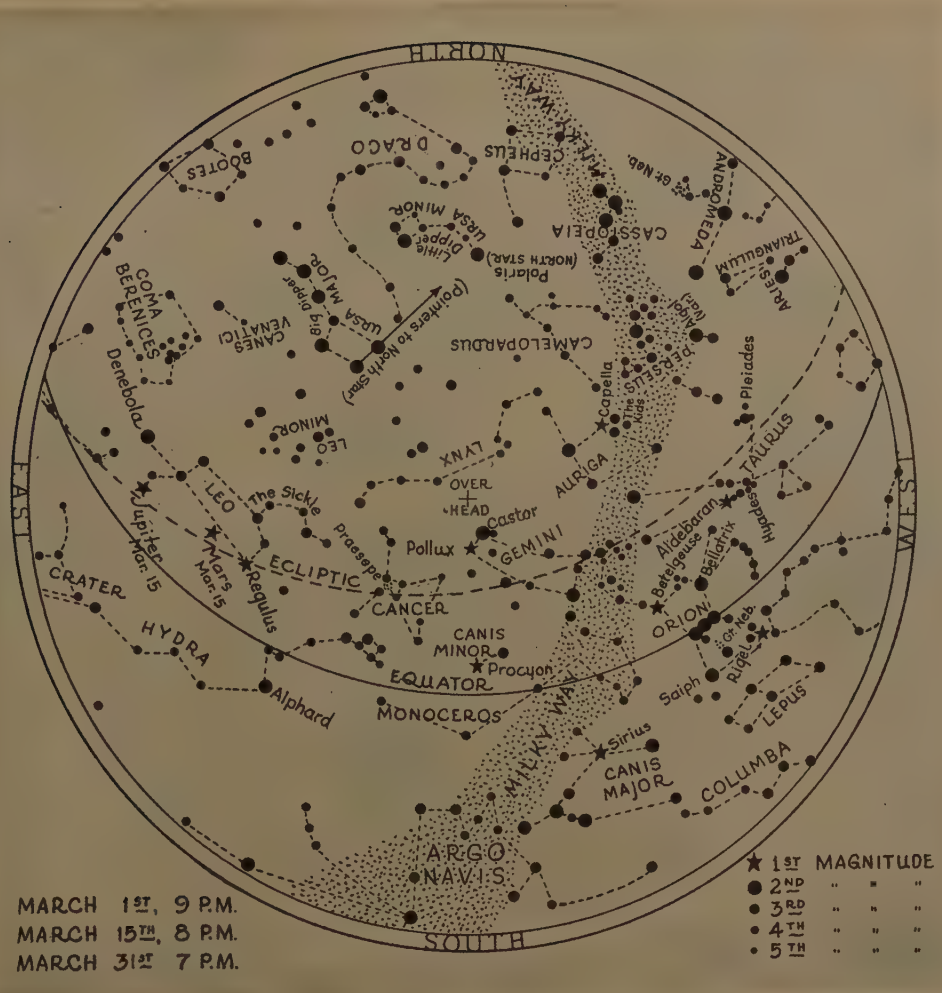
Of nut trees, taking the country as a whole, black walnuts would probably head the list. As a shade tree it lacks the denseness of most trees, in fact quite a satisfactory lawn will grow beneath a black walnut tree, which is more than can be said for a great many trees. Where hardy, the English walnut is a satisfactory shade tree, but its large spread at maturity precludes use in many yards.

Besides the weeping cherry, there are other similar forms suitable for use in the moderate sized yard. Some kinds grow large, including the beautiful weeping beech, the Camperdown elm or the weeping willow, but these forms of dogwood, birch, mountain ash, mulberries and cherries seldom attain any great size. The weeping birch, while not a long lived tree, has proved satisfactory in locations subject to extremely high gales. In the windswept gorge of the Columbia River where spruce and fir trees retain but a straggling of malformed boughs upon their leeward sides, the slender swaying branches of this birch withstand more punishment than most other species and amply justify its popularity.

Weeping trees can not be planted just anywhere; they must have a location where their pendulous branches may develop without interference from other plants. On the whole, they are not the easiest type of tree to use in one's landscape, but properly located, become most effective. Mrs. Schuyler Van Rensselaer's charming book, *Art Out-of-doors*, condemns the prevalent practice of placing these trees, especially the weeping willow, beside a pool or lake, claiming their drooping lines conflict, rather than harmonize, with the repose, simplicity and breadth of horizontal lines expressed by a sheet of water. She suggests that overhanging a waterfall or cascade where there is perfect harmony of lines is an ideal setting for weeping trees. These trees with pendulous trailing branches have a charm that is all of their own. Coleridge called the weeping birch "The Lady of the Woods" because of its grace and charm, its poise and beautiful white bark. It is said that ancient books, dated about 700 B. C., were written upon the bark of this tree.

The planting and care of properly selected trees in grounds of limited area is simple indeed. Give them room to grow naturally and at least sufficient good soil at planting time in which to make a good start. In lean soils, feeding is well worth while. Don't neglect them, at least during the first few years after planting, and keep in mind that tree roots must be encouraged to penetrate deeply by thorough watering. Occasional thorough watering is much better than daily wetting of the surface. Prune when necessary to correct faulty form but do not butcher trees by cutting them into unnatural shapes. Most trees have characteristic forms and any attempt to force other shapes upon them generally meets with little success.

Evergreens play an important rôle in the home grounds, especially if selected properly. They are another story, however, and must wait till some future time. A warning is not out of place, though, don't plant "cute" little spruces, pines and firs which, in reality, are giants of the forest, and expect them to remain small. It's not their nature and the more we learn about trees and their habits, the more we realize that each kind has its particular use. Seek to understand your trees, that is the secret.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

THANKS TO THE TELESCOPE

FEW WONDERS OF THE HEAVENS WOULD BE REVEALED WITHOUT IT

BY ISABEL M. LEWIS

MODERN telescopes, with their chief accessories, the photographic plate and the spectroscope, play such a fundamentally important part in astronomy of today that one cannot conceive the possibility of any advance in our knowledge of the heavenly bodies as physical objects without their aid. Were it not for our telescopes we would know little more about the wonders of the heavens than the ancients knew with their painfully limited vision.

There are between five thousand and seven thousand stars in the entire heavens within reach of unaided vision, the number varying with seeing conditions. Even among these stars there are hundreds that are attended by companion stars of whose existence we would know nothing were it not for the telescope. These physically connected stars are in mutual revolution, in some instances almost in contact and mutually eclipsing each other as seen from the earth at each revolution. This causes periodic variations in the light of the brighter star as we see it. Again they may be separated by many million miles and their periods of mutual revolution may run into thousands of years. Sometimes three or more stars form a connected system, such as the star Epsilon Lyrae, barely visible as a double to the naked eye. Each star of the wide double is resolved by the telescope into two stars so there are four stars in the system and, in addition, the brightest star has a companion so close that the two cannot be separated by the telescope. In this case the spectroscope reveals its presence by a shift in the spectral lines. Some of the brightest stars have companions, including the Dog-Stars, Sirius and Procyon, Rigel, Alpha Centauri, Capella, Spica and Antares.

Hundreds of millions of stars of whose existence the ancient astronomers never even dreamed have been re-

vealed to us by powerful telescopes of today. The great Mt. Wilson reflector will show, on the photographic plate, stars of the twenty-first magnitude. Such a star will give only one one-hundred-millionth of the light of a first magnitude star. In other words one hundred million stars of the twenty-first magnitude would give with their combined brightness only as much light as a star of the first magnitude, such as Altair.

In addition to increasing enormously the number of stars within our range of vision, the telescope has revealed to us countless wonderful and beautiful objects, such as the great irregular gaseous nebulae in Orion and in Cygnus and Perseus, and many other parts of the Milky Way and nebular matter surrounding certain types of stars such as the Pleiades, and stars in the Great Nebula in Orion. It has resolved the great globular clusters such as the Great Hercules Cluster, which is composed of thousands upon thousands of stars, brighter suns than our own, in a compact system over thirty thousand light years distant from the earth. It has made possible the exploration of the extra-galactic nebulae, as they are called, which are numbered by the hundreds of thousands and of which the most illustrious example is the Great Andromeda Nebula. On a clear, moonless night this nebula may be seen as a faint patch of light, but its marvellous structure is revealed only by long photographic exposures with the aid of powerful telescopes. Most everyone has seen photographs of this beautiful object which is nearly one million light years distant from the earth and yet is one of the nearest of the great spiral nebulae which are spoken of as island universes. The spiral arms of these nebulae are in some instances resolvable into swarms of stars, which, at the great distances at which these objects are known to be, must be hundreds, in some cases thousands, of times brighter than our own sun to be visible as stellar points of light. Many of these far distant nebulae, among the most distant known objects in the universe, are not resolvable into stars and appear as globular masses of nebulosity with bands of non-luminous matter surrounding them, which reminds one of the dark nebulous streaks and bands in the Milky Way.

These mysterious nebulae revealed to us by modern telescopes aided by photography, which makes possible the accumulation of light by exposures of from one to ten or more hours, are among the most remarkable objects in the heavens. Their form in most cases implies rotation about nebulous nuclei and they are generally spiral and flattened in shape. There are, however, many odd forms, some circular, some elliptical, some spindle-shaped. They are more frequently than not lens-shaped bodies seen at various angles, although a few appear to be truly spherical in shape. A study of the light of these objects with the spectroscope seems to show that they are vast systems of stars, which are not visible separately because of their great distance, or that they consist of great clouds of dust illuminated by stars that lie within them. The first view is the one most generally adopted since photographs taken with the most powerful reflectors have begun to resolve the outer arms of many of the spiral forms into individual stellar points of light each of which must be a mighty sun many times more brilliant than our own sun.

The planet Uranus may be seen without the aid of a telescope as a star of the sixth magnitude on a clear, dark night if one knows exactly where to look for it. It probably would have been discovered eventually even if telescopes had never been invented. Two planets in addition to Uranus, Neptune and Pluto, each hopelessly beyond the range of naked-eye vision, the Rings of Saturn, the nine satellites of Jupiter and of Saturn, the two satellites of Mars, the four satellites of Uranus and the satellite of Neptune, more than a thousand asteroids, only one of which is ever within the range of naked-eye vision, hundreds of telescopic comets, never visible to the unaided eye, are part of the harvest that has been gathered in by astronomers with the aid of telescopes. In the study of the surface of the moon and the surface markings of the planets the telescope is invaluable, especially when the spectroscope and certain devices for measuring the radiations of the planetary surfaces are brought to its aid. The more powerful telescopes bring the moon within less than one hundred miles of the earth and show objects on the moon as small as a quarter of a mile in diameter. The visible surface of the moon has been mapped more accurately in its details than some of the most inaccessible regions of our own planet.

The planets are rotating bodies. From a study of their surface markings and the speed with which they move across the visible disk of the planet, as revealed by the telescope, it is possible to determine the period of time in which the planet makes one revolution on its axis. So clearly are the surface markings of Mars defined that it has been possible from a long series of observations to determine the rotation period of this planet, or the length of its day, with an error not exceeding a few hundredths of a second. To determine the rotation periods of Jupiter and Saturn is a more difficult matter, not because it is difficult to observe clearly defined objects on the disks of these planets but because different spots give different periods of rotation according to their origin and latitude. This is not strange when it is remembered that these planets have dense atmospheres and swift equatorial currents and that the markings themselves are in motion and are only of a semi-permanent nature.

Uranus and Neptune are so much more distant that even powerful telescopes reveal no markings and nothing is known of the length of the rotation period of Neptune. The planet Uranus is so flattened at the poles that it is known that it must be in rapid rotation.

It is very difficult to see any surface markings on Mercury. The Italian astronomer, Schiaparelli, in 1889 announced the discovery of faint markings that did not change their position on the planet's disk in several hours. It was therefore assumed that the planet rotates in the same period that it revolves around the sun, or eighty-eight days and so al- (Continued on page 149)

NATURE RAMBLES WITH UNCLE DICK

A DEPARTMENT FOR THE YOUNG FOLKS

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TITTYMOUSE'S CAGE WAS FIXED WITH SAND ON THE FLOOR TO REMIND HIM OF THE DESERT WHICH HAD BEEN HIS HOMELAND

TITTYMOUSE

BY ELEANOR B. PACK

"'TITTYMOUSE and Tattymouse lived in a house,'" read Norrie. "But, Mummy, were they like our Tittymouse?"

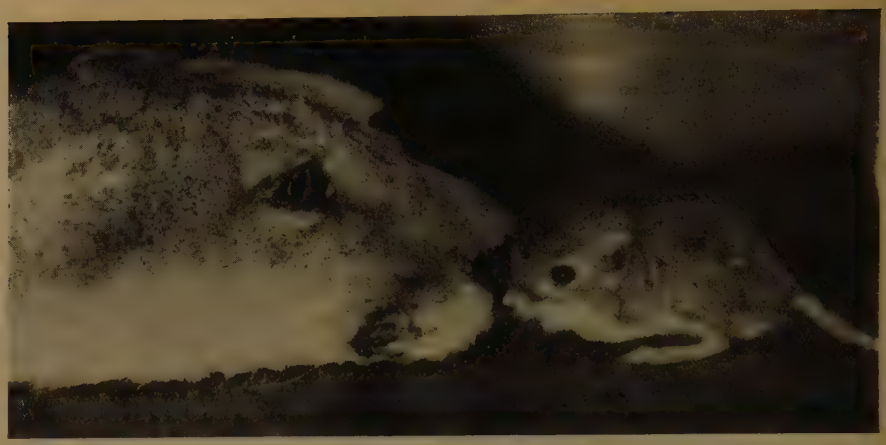
"I don't believe that they had such long tails. Do you?" I replied.

"No, but, Mummy, let's call him Tittymouse just the same."

Thus Tittymouse was christened.

We were sitting in the living room watching a little creature hop across the floor on long hind legs, his tiny forepaws held close to his body and his long, funny tail stuck out behind as though to balance him. Norrie sat on the floor and softy tapped the green carpet. Titty paused and then danced in long quick hops in her direction. Reaching her hand he paused again, looked up at her with his large, shiny black eyes, twitched his long graceful whiskers questioningly and then was off again to chew on my shoe string. Having satisfied himself that shoe strings are poor food, he went in search of more exciting adventure. Suddenly, reaching the edge of the carpet, his feet went out from under him and he landed sprawling on the polished floor. Gathering himself up, he start-

HE FILLED HIS CHEEKS WITH THE BLOOMS OF THE HONEYSUCKLE, USING HIS TAIL AS A PROP



THE LION AND THE MOUSE. TITTYMOUSE EXPLORES THE NOSE OF THE MOUNTAIN LION RUG, GETTING HIS WHISKERS ENTANGLED WITH THE LION'S

ed back towards the carpet, his long ungovernable hind legs shooting out unexpectedly at each step. Titty was puzzled. He stayed quiet a moment. Then he started to crawl again. Again the hind legs shot out from under him. It was a bewildered mouse that finally crawled out upon the carpet and sat down to ponder.

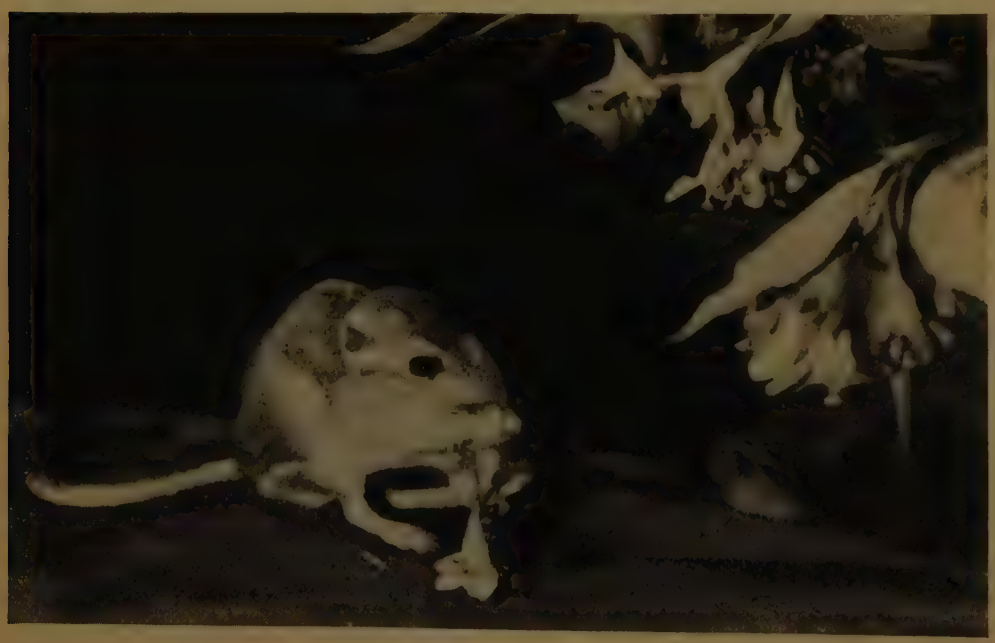
For some moments we sat chatting and forgot Titty, because Bill had come in to visit with us. Suddenly Bill jumped up and began to dance around the floor hanging on to his leg just above the knee.

"Get him out, get him out!" he shouted. "Ouch! He's tickling! Help!"

Out, from the dark cavern of Bill's trousers, popped a dazed mouse. Landing with a thud on the carpet, he looked about in a surprised manner, then darted under the sofa to think it over.

"I think that Titty ought to have a treat after such a scare," said Norrie, jumping up to get a small vase of pink honeysuckle from the table. She placed it on the floor to coax Titty from his retreat. On all four feet Titty crept along the floor toward the flowers, sniffed the air, and then stood on his hind legs to pull the blossoms down to him. Using his tail as a prop, his long hind legs stretched to amazing lengths as he reached upwards and, using his tiny front feet as hands, pulled the flowers down and nibbled them greedily. Stuffing the pink petals into his cheeks like a chipmunk until both cheek pouches bulged, he scampered into a corner of the room and there disgorged them in a little pile. Then back he raced to the flowers for a second haul. Not wishing to lose all my flowers, I knelt down and raised the vase almost out of reach. What antics he did go through to reach the flowers, jumping and grasping wildly in the air to catch hold of the nearest stem. Finally he did get hold of one, and then, hanging on by his forepaws, his hind legs dangling wildly in mid air, he plucked the petals as fast as he could before his hold loosened and he dropped back once more to the floor.

Tittymouse had arrived a month before in a small crate from the desert of California. Being used to exist for weeks on end without water, he had not minded the trip to New Jersey. His diet of sunflower seeds was easy to supply.



If you haven't already guessed, Titty was a kangaroo rat. To us he did not even suggest a rat. He was a soft sleek fawn-tan on his back and snowy

WITH A FACE FULL TO OVERFLOWING WITH HONEYSUCKLE BLOOMS, HE DASHES AWAY TO HOARD HIS STORE OF DAINTIES

white underneath. His paws were white and he had long twitching whiskers. His long tail, many sizes too large for him, was tipped by a brush of wiry hairs. He always seemed to worry about his tail. Often he would stop suddenly, twist around and pull his tail in, hand over hand, until, reaching the tip, he would sniff at it a moment or two, then drop it and continue his wanderings relieved to find it still with him.

Titty was given a large wire cage in a sunny corner of the sun porch. A sandy floor reminded him of his home in the desert. Titty at once set to work to make a burrow by hollowing out a soft, round hole in the midst of a large wad of cotton we gave him.

HANGING ON TO GET THE LAST BIT THAT HE CAN, USING HIS TAIL IN A MOST HANDY MANNER

Daytime in mouseland is sleep time, and when Titty was not soundly asleep in his burrow, he was stretched out in the sunshine taking a sun bath. As soon as evening came, however, we could hear him scratching around in his cage demanding to be let out for his daily run.

Jimmy, the collie, had soon become resigned to the new arrival, and, lying on the rug in the living room, allowed Titty to pull his tail and play leapfrog on his back. He did, however, consider himself abused when Titty nipped at his toes. On these occasions he would get up with an air of injured dignity and stalk out of the room.

Watching Titty hop across the floor, I thought of one night on the Arizona desert when we were looking for a place to camp. Every now and again a tiny creature leaped across the road, the tiny desert rats flashing for a moment in our headlights. That night, as we lay on the bare ground in our sleeping bags, we could hear the scurrying of tiny feet in the sand and an occasional squeak. When morning came we found ourselves camped near a large mound of sand, spotted here and there with the openings to underground burrows. As we had never before seen these desert apartment houses, we took a shovel and dug a bit to see just what lay hidden underneath. The burrows of the kangaroo rats were clean little runways. Around the entrance tiny footprints told of nightly wanderings. Every night, before going forth, they must listen and watch to discover whether some hungry coyote may be crouched outside. Danger from the air lurks in every moving shadow, the only warning of the silent flight of a desert owl. The rats warn each other with tiny squeaks when the enemy is at hand.

"Oh, Mummy!" said Norrie one evening, "look at Titty! He's trying to make friends with the mountain lion. That's like the story of the lion and the mouse."

There sat Titty on his hind legs, feeling tentatively of the cold nose of the mountain lion skin on the floor. Satisfied that all was well, he began to investigate further, getting himself tangled up when his long twitching whiskers became enmeshed in the whiskers of the lion.

Later that evening, as we sat around chatting and drinking ginger ale, I wondered if Titty might not like the moisture on the outside of the glass. Surely this small amount would not be too much for him. I placed the tall glass on the floor. Titty soon came to investigate and set about ravenously licking it. His nose was so sharply pointed that his small, undershot jaw made it impossible for him to lick as any ordinary animal might. Bracing himself against the glass, resting his tiny fore feet daintily at either side, he rested his chin along the surface and so was able to lick. Having made a thorough job of the exterior, he was determined to have more. So he stood on tiptoe to reach the top of the glass. Before we realized what he was about, he sprang to the top, balanced himself a fraction of a second, and then jumped down into the depths of the glass. The glass had not tipped over, even with his whole weight on one side of the rim. Not being large enough for a whole kangaroo rat, the glass did not allow Titty to stand on the bottom. He remained head first, with hind feet part way up the sides, and with tail draped up over the edge of the glass. But Titty was happily licking the remaining liquid at the bottom. Just as I was wondering if I had not better empty the glass of its unusual contents, Titty made a convulsive movement and somehow turned himself inside out. Anyhow, he now appeared right

side up and calmly jumped neatly out of the glass.

Life was always an adventure to Titty. There was always something new around each corner, and some new surprise waiting on the summit of each mountainous chair he climbed. The living-room was an exciting world for him. After each adventure, it was a tired mouse who snuggled down in his warm nest and curled up in a tiny furry ball.

THE CANARY CONTEST

BY UNCLE DICK

BEING a judge is not an easy job. I can tell you that and so can Uncle Bruce Horsfall and Uncle Russ Edwards, who helped me pick out the best answers to the question of what the canary on the January cover was thinking. Here is how we did it. We went carefully over all of the answers and picked out what we thought were specially good. Then we went over those and picked out the specially good of the specially good. Finally we had thirty left. And then it was really hard. But, at last, we chose ten that we felt to be most original and interesting. That left us the ten winners, but we thought we should print the names of the other twenty who got into the last group as a sort of honorable mention.

First we must give you the winners. The names are not given in order of excellence because it was not possible to pick out a "best" among the ten. So here are the names of the winners just as they come on the pile beside my typewriter:

Joseph F. Downey, New Bedford, Massachusetts; Vivienne Tyler Johnston, Waynesboro, Georgia; John Suetterle Taylar, Milwaukee, Wisconsin; Isabel Liciano, Amsterdam, New York; Bob Drew, Santa Monica, California; Muriel Louise Zoll, Elmhurst, Long Island, New York; Cooper Evans, Grundy Center, Iowa; Rosalie Hoffman, Newark, New Jersey; Roy Martin, Cedar Bluffs, Nebraska; Robert A. Griffith, Boone, Iowa.

We would like to be able to give twenty more prizes but we will have to be content with Honorable Mention for:

Marianne White, Mount Kisco, N. Y.; Ruby Strohman, Gordon, Wisconsin; John C. Withers, Roanoke, Virginia; Lewis Hine Cameron, Hays, Kansas; Hellen Blanchard, Houma, Louisiana; Margery Dodge, Portland, Oregon; Louis Trescony, San Lucas, California; Karl J. Ashley, New Bedford, Massachusetts; Jayne Drew, Santa Monica, California; John S. McAndrew, Middletown, New York; Elizabeth Thayer, Yonkers, New York; Marion Louise Small, Oil City, Pennsylvania; Charles L. Remington, St. Louis, Missouri; Helen Greeley, West Acton, Massachusetts; Virginia Mitchell, Oxnard, California; Ruth Garlock, Joplin, Missouri; William Van Allen, Mt. Pleasant, Iowa; Marion Nell Boden, Nyssa, Oregon; Jimmy Babbitt, Muncie, Indiana; Virginia Mae Smith, Manchester, Iowa.

Now I want to thank all those who studied the picture on the cover on the January Nature Magazine and who wrote so sympathetically about what the little canary might be thinking. Some day, when we have rested up from judging this contest, we will try to have another one.

BUDDIES . . . . .

. . . . BY HORACE C. FROST

THE BOOK MART

The editors of Nature Magazine, realizing e limited distribution of Garden Books d the seeming reluctance of most book alers to stock them, in addition to the nentable lack of information as to which es are the most valuable to meet definite eds, are herewith inaugurating a book pply service together with individual per- nal advice upon the purchase of books. ch month this column will suggest four to books which will be carefully selected to particularly valuable additions to the ref- ence library. The editors will also be glad personally answer inquiries about Garden oks or other types of Nature literature th no obligation to buy, though Nature agazine is only too glad to supply the needs its readers along this line. Here are four oks which gardeners will value highly—

ALL ABOUT FLOWERING BULBS, $2.15 stpaid.—T. A. Weston, the writer, is e of the most practical and well informed antsmen in the country and this book, ritten from personal knowledge, will prove be of inestimable value in the hands of ery amateur. It is simply and entertain- gly written and authoritative in every re- ect. The present volume is a revised and -written issue of a former best seller mong garden books.

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Order these books through NATURE MAG- ZINE, terms, cash with orders.

Toledo Naturalists

A program of wide variety and interest o the Nature lover has been worked out or this spring and summer by Toledo Field Naturalists' Association. The program in- cludes alluring field trips and some notable ectures. Roger Conant of the Toledo Zoological Society is the president of the Association.

Poetry Prize

Announcement is made of the award of the first prize in the Elberta Clark Walker Memorial Nature Poem contest to Marion Stauffer Doyle of Hooversville, Pa. The second prize was awarded to Louise Cren- shaw Ray of Birmingham, Alabama. The contest is sponsored by the Chattanooga Writers' Club.

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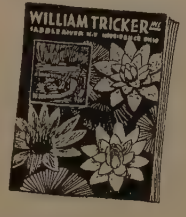

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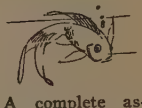

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Queen Anne's Thimble and the Bachelor's Button!

Believe it or not—they're shown together on Page 78 of Dreer's 1933 Garden Book! Too bad that Adam's Needle is so far away—on Page 108—and that there's no sign of the thread!

Whimsical? Yes—but only between the lines. For this "Book of the Year" for amateur gardeners contains 210 pages of authoritative facts on flowers and their culture. It is free on request to those interested in vegetable and flower seeds, roses, perennial plants, etc.

HENRY A. DREER

Dept. L-3 1306 Spring Garden Street, PHILADELPHIA, PA.

DREER'S

A GARDEN SERVICE

The Garden Editor of Nature Magazine is at your service. Follow his department monthly for valuable and original hints.

Why the Squirrel Moved

BY BERTHA V. HARTZELL

Looking out of my chamber window recently at a cluster of great bare tree trunks, I discovered a tiny face peeking out at me from a hole near the top of a dead limb. It was a gray squirrel which I had often seen scampering over the boughs, and leaping from branch to branch. How secure she must have felt in that hollow tree, so high above the ground!

But the big maple was decayed and unsafe. A few days later, tree men with saws and spiked heels came to cut it down. When the axe first struck the trunk of the tree the squirrel leapt in terror from her hole to the next tree, making sounds of alarm. The men glanced up at her curiously, but went on working. After a while they gave the final blow, stepped aside, and the tree crashed down with a mighty thud. But what was that soft stuff which fell out from the top? One of them hurried forward, crouched down and picked up a nest with tiny baby squirrels in it—too young to have any fur or do anything but squeal and wriggle. "What shall I do with them?" he asked. Carrying them a little way off, he laid them at the foot of a small tree, where in the wind they would soon have become uncovered, had not a lady from the house placed them in a small box, open only at the top. The mother squirrel was by this time so terrified that she fled from the scene.

As the men were leaving for their lunch hour, one of them stooped over the box, looked at the babies, stood up with the box in his hand, and decided to place it at the foot of the next tree to the one which had been cut down. While I was worrying about the fate of the wee babies, I heard a chattering in the trees. The mother had returned! With anxious care she searched all the other trees in the group, hunting for her lost family. Finally she crept out on a branch close to my window where she sat still for a long time apparently thinking it over. Then she descended the tree-trunk jerkily. Would she see the box? No, it was the wrong tree. But presently she moved along the ground nearer and nearer until either a sound or a smell caught her attention. Up went one little foot and poked the box. It moved, and the foot was quickly withdrawn. Then she sprang to the side of the tree from which she could look down, and in a flash was in among her babies.

Then the excitement began. Out she came with a tiny bit of flesh in her mouth, took a quick look about, dashed across the lawn, cleared the sidewalk and the street in a few wide leaps, sprang to the bark of another tall tree, and raced up to the very top, to a hole I had never spied before. In she went with her baby, then in a flash was out again, down the tree, across the road, the lawn, and into the box for another. This time she had to dodge children coming from school and even an automobile, but she made it, popped that baby into the hole, and was back for the third. A few more seconds and the fourth, too, was safe in its new home. The mother returned then more leisurely and rummaged about to be sure she had them all. After that she herself moved over across the street, and she plays about my trees no more.

When the men came back from lunch, one of them went straight to the pasteboard box, knelt down and put a gentle finger in among the leaves. He was quite still for a moment, until I called from the window and told him what had happened. His face lighted up with satisfaction. "I wasn't sure whether they could carry them like that," he said.

Canine Alpinist

Fido is a fox terrier. His master is Marcel Moussillon, Alpine guide. One day the guide was out on a trip and Fido failed to start out with him and, much perturbed, started on a hunt. He headed for Mount Blanc and, on his way, caught up with a party of climbers, among them a friend of his master. He thought he must surely be on the right trail and followed the party to the first refuge hut. It was then a problem what to do with him. To leave him might well mean the end of Fido, so the next day when the group moved on Fido was among them. He walked most of the way but was glad now and then to have a lift. He was cold but he was looking for his master and that was all that mattered. So that night Fido stood atop the 15,781-foot monarch of the mountains, a dog with a distinction. His companions wrapped his paws in wool and provided Fido with a sweater against the biting cold, and with them the terrier made the descent to Chamonix, on the French side, and returned by bus to Courmayeur, whence he had started. As the bus drew into the public square and Fido descended from it, he met an irate master, who addressed him vehemently, angry, now that his anxiety was relieved.

"Ah, here you are, species of brigand, you filthy tramp, you piece of a tomato can," blustered Marcel.

Fido, it is said, took the berating with a proud perk of his ears, even with a bit of a smirk, while his companions of the climb told of their brave four-footed fellow Alpinist. Bursting with pride, Marcel swept the little fellow into his arms.

"Ah, my old," he said, "it is not for nothing that you are the dog of Moussillon, the Alpine guide!"

"Arp, arp," Fido replied, which meant, of course, "it was, indeed, nothing."

Two miles south of Exira, Iowa, on h
way number seventy-one, stands a burr
tree that has grown straight and beaut
notwithstanding the difficulties of its yo
Fifty years ago Mr. F. J. Leffingwell
ished the spring plowing on his fath
farm, turned the plough up against a sap
and went about the summer's work.
plough was forgotten and the young
moved to town. Now the tree has enc
passed the plough. The beam of the plo
extends through the exact center of
trunk of the oak, and the point of the s
is embedded in the wood. Motorists on
highway often stop to wonder at this d
onstration of Nature's method of attai
its appointed end notwithstanding an
stacle thoughtlessly placed in its way
the hand of man.

Strange Apples

Many years ago I saw a strange freal
Nature in my father's orchard. In
blooming season a small Siberian Crab
produced an immense globular cluste
flowers near the top of the tree. It
impossible to count the blossoms, and
the petals fell, it was supposed that
show was over. Late in the season some
discovered that most of the blossoms
set fruit, and the cluster grew until it
seven or eight inches in diameter, sound
very solid. It was a puzzle to know
to count the apples, but finally some
suggested that a pin be stuck in each ap
then when all were pierced, take out
pins and count them. This was done
there were one hundred and twenty-
pins. I knew the tree for several years a
but it displayed no more freak tenden

H. M. WOODWARI

Nature Camp

Receipt of the bulletin announcing
program for the summer session Na
Camps of Pennsylvania State College is
advance breath of spring fraught with
promise of summer. Under the directio
Professor George R. Green, the camp
be held this coming summer in its lo
setting in the heart of the famous Tu
or Seven Sisters Mountains in Stone Va
sixteen miles from State College, Penn
vania. It is a region rich in wild life
opportunity for actual field work.

GARDENS AND GARDENING

Edited by
ROMAINE B. WARE

Astronomical calculations tell us that spring does not start until 8:40 P.M. March 20, but every gardener knows better than that. For them, spring begins with the blooming of the first snowdrop, the upthrust of the spear-like crocus and the bursting of the pussy-willow catkins. These and many others offer the prelude to Nature's vernal symphony. In fact many gardeners scent the advent of spring in the arrival of the first seed catalog.

These harbingers of spring remind us that seed orders should be sent at once, that slow-germinating varieties like verbena, petunias, castor beans, moonflowers and others should be started early. Hard-shelled seeds like moonflowers should be soaked in water for twenty-four hours before planting to give them a start. For early blooming it is not too soon to start seeds such as asters, lobelia, zinnias, marigold, stocks, candytuft and ageratum. All these grow rather slowly but transplant easily and are better plants as the result. *Cobaea scandens* is an excellent annual vine if started early, climbing twenty feet or more and having interesting blooms. It is said to germinate best if the seeds are planted edgewise.

Everyone loves the glorious blue of delphinium and now it is possible to enjoy whites of equal quality. They grow from seed as easy as the blues. At first thought it may seem that white delphinium can not have the charm of the blues, but once you see these gems in your garden you will like them equally well.

Shrubs, roses and lily bulbs for spring planting should be ordered at once. Late orders during the spring rush can not be given the attention accorded the early arrivals. Shipments can be timed for planting according to your locality but now is the time to choose and order. Try some of the new things this year, add something different. Plan to make your garden a bit unusual, not freaky, of course, but try to lift it out of the commonplace. The novelty sections of the new catalogs are interesting.

Each season there are scores of new roses offered. Some never amount to a great deal, but there are always a few which find a permanent place in the favor of rose lovers. According to one of America's greatest authorities, the new climber, Breeze, is the most important introduction this year. It is practically identical with Paul's Scarlet Climber in every respect except that it is an everblooming variety. Gradually there is being developed a much-wanted class of everblooming climbers and Breeze is most welcome. Other novelties of merit are: Amelia Earhart, one of the largest roses in existence; Souvenir, a yellow Talisman; Thomas A. Edison, an exceptional "hot weather" rose, and Condessa de Sastago, a Spanish origination of startling brilliancy. There are several others of great merit but limited space prevents the inclusion of all.

Just as milady gets ideas upon spring styles from the store windows, so gardeners can learn by visiting the show gardens and test farms of the nurseries and seedsmen. Early in the season the bulb farms are most fascinating. The specialists in rock plants offer gay pictures as blocks of alpines burst into bloom with the first breath of spring. All the nurseries have interesting displays as the season advances and you are welcome to visit them and see the new and worthwhile things. Such visits are time well spent and add greatly to one's fund of garden knowledge.

If you did not prepare a sweet-pea trench last fall, it should be done at once. Sweet peas, like their lowly cousins of the vegetable garden, grow best during cool weather and early planting offers more chances of success. Buy the best seed you can afford as quality is of paramount importance with sweet peas. If you grow but a limited quantity of fine sweet peas, they may be started indoors, in pots, and set out in the trench already growing. Do not start them too soon as excessive root growth is undesirable.

One of the most important details of seed sowing is the seed bed. Soil for this should be fine and light with a goodly portion of leaf mold or humus in it. Good garden loam made light and porous by the addition of sand and finely sifted leaf mold is best. Humus and leaf mold in several forms may be purchased commercially in large or small

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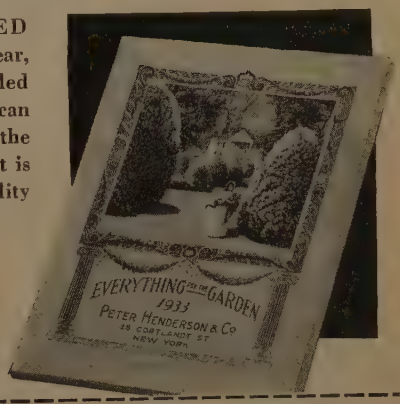

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quantities. One brand, known as Hyper-Humus, is an especially prepared product which is ideal for seed bed purposes when mixed with sifted garden loam. Similar products are available in many sections of the country.

Seed sowing is facilitated by the use of some of the little devices available for scattering fine and coarse seeds evenly. One of these is known as the Sowrite Seed Sower and is highly recommended by those who have used it. Seeds should be scattered evenly and neither too thickly nor too thinly. Crowded plants are likely to fall prey to disease such as damping-off, that dreaded fungus disease. Treating your seed beds with some of the mercurial compounds such as Semesan will control this disease. Fine seeds should not be covered with soil, merely pressed into the surface; others may be covered about four times their diameters by sifting pulverized leaf mold over them. Firming the soil well and covering with a newspaper will conserve moisture but the paper must be removed as soon as the seedlings begin to break through the soil. Do not over-water but never allow the seed bed to dry out even for a few hours or it may prove fatal to the tiny plants. Good drainage is absolutely essential and must be provided as the seed bed is made.

Of all flowers for cutting, gladioli are probably the most popular during their season. Vast improvements have been made in them during the past two decades. The flower spikes are finer with more blooms open at one time, colors have been refined and improved, lasting qualities are better and, taken all together, glads are one of our most important flowers. Unless you are already a glad "fan", you will do well to send for the catalogs of several growers and give yourself a treat by learning about these popular flowers. Glads were originally wild in several of the far corners of the world and modern hybridizers are still experimenting with the wonderful possibilities latent within these species. Here is a field of great opportunity. Many of the wild species are available from the specialists and hybridizing can easily become a most delightful and fascinating hobby.

Until recently, glads have had almost no insect pests but the last few years have seen the advent of "thrips", tiny insects which, if neglected, can wreak almost unbelievable damage in the gladiolus patch. According to the best authorities, however, they can be controlled and much of their damage forestalled. The *Gladiolus Review*, official organ of the American Gladiolus Society, has acted as a sort of clearing house for information on this pest. There are several precautions the average backyard glad fan should, by all means, observe. Aphis on roses, potato bugs and scores of other pests are controlled with sprays and it has been learned that daily spraying with a strong force of plain water will go a long way in keeping thrips in check. They cannot breed where moisture is present and although the insects and their eggs are under the bud sheaths where it is difficult for spray to reach, regular daily applications of water have done the trick.

Elmer E. Gove, a grower who specializes in fine glads, writes me that even where no thrips are suspected, he would strongly advise disinfecting every bulb before planting. Of the several formulas suggested, the following is one of the simplest. In twenty-

30 GLORIOUS GLADIOLUS $2

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Do not miss announcement of valuable garden books on page 143.

five or thirty gallons of water, thoroughly dissolve one ordinary can of lye. Use wooden containers and soak the bulbs ten to fifteen hours in this, drying them thoroughly thereafter. Other phases of thrip control will be taken up in these columns later, as the season advances.

Lilies are not common in the average garden but there is no reason why more of them should not be grown. Among the many varieties that may be put in during early spring are Regal, Speciosum, Auratum, Henryi, Tigrinum and Hansoni. These are comparatively easy to grow but as all of them are stem-rooting, they must be planted with the base of the bulbs eight to ten inches deep. Be certain they have good drainage and well-prepared rich soil for at least a foot (two would be much better) below the bulb.

Why not add a wild flower sanctuary to your garden? Such plantings are not for the formal garden area but in many yards there are ideal sections for them. Wild flowers do not require the same type of care and attention we give to ordinary garden flowers but details such as soil, drainage and exposure should not be overlooked. Soil acidity, too, is very important with the wildings. A wild flower garden opens delightful opportunities for the "unusual". Growers and collectors from many sections offer countless varieties of seeds and plants, thus affording a large and intriguing field to the backyard wild flower enthusiast.

NOTE—The Garden Department has on file scores of catalogs covering almost every phase of gardening and garden equipment. If there are any kinds of seeds or plants you can not locate or any garden subject upon which you wish information, drop us a line and we will do our best to supply the information. Address the—
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Rat and Rabbit

Just at dusk, a tiny baby bunny ventured from its nest among the shrubbery on an East End, Pittsburgh, lawn while its mother was foraging in a nearby garden. A watchful, hungry rat stealthily crept along the foundation line of the house next door, made a dash for the helpless rabbit, and gripped its hind legs in his teeth.

The pitiful squeals of the victim, sounding to human ears like the chattering of fighting sparrows, reached the ears of the mother rabbit and brought her hopping across the street to her offspring's rescue. As the rat spied the approaching full-grown rabbit, he dropped his prey and scampered to his hole, hotly pursued by the mother rabbit.

Baby bunny dragged itself to the cover of a clump of shrubs, but its mother, evidently petrified with fright, sat motionless for several seconds after the disappearance of the rat. To escape the gaze of several people on the verandah she finally withdrew to a nearby bush which shielded her from prying eyes, but from which she could watch her injured baby. She kept this vigil until those who had witnessed the tragedy had retired.

Next morning, the tiny rabbit was found with broken legs under the sheltering shrubbery, but the mother was nowhere in sight. It is still a question whether she ministered during the night to her baby. J. C. CARLISLE.

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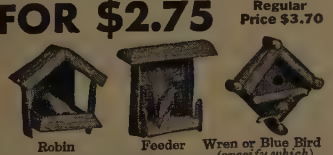

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IN BEHALF OF LIME

(It seemed to the National Lime Association that our recent article entitled "Don't Lime the Lawn" did them an injustice. Perhaps it did. There are usually two sides to a question, and more and more is being learned about when to lime and when not to. In any event we were glad to extend the courtesy to the friends of lime to plead its case, and the following article is written by H. A. Huschke, director of the agricultural department of the National Lime Association. EDITOR.)

The old adage, "There is a time and place for everything," applies to the use of lime on lawns as it does to many other things.

At the outset it will be well to mention that no student of the subject, be he ever so ardent a booster, can very well recommend the old practice of "whitewashing" a lawn each and every year. It isn't necessary. But with equal emphasis, it may be stated that lime should be applied if and whenever it is needed.

To clarify the above statement it is necessary to present a few agronomic findings which have been proved without a shadow of doubt at most of the State Experiment Stations located in the eastern half of the United States. One of these is that about 75 per cent of the soils in the eastern half of the United States are acid or "sour". Another is that few plants really thrive in a strongly acid soil. The third is that whenever lime is applied to such soils the response of acid-sensitive plants is remarkable.

It so happens that the most desirable lawn grass of all—Kentucky blue grass—will not tolerate strong acidity. It grows well in fertile soils which are moderately acid to neutral. Into this same category falls white clover which is so often used in combination with Kentucky blue grass. The bent grasses have a reputation for being quite tolerant of soil acidity but, as it will be shown later, they respond to liming when the soil is strongly acid.

Unfortunately, personal experiences never find their way into scientific literature. If they did, it would not be difficult to defend the case for lime. However, sufficient controlled experimental work has now been completed to substantiate the opening statements of this discussion.

From authoritative bulletins which report this work, certain passages will be cited. The first one is taken from the May, 1929, issue of "The Bulletin" published by the Greens Section of the U. S. Golf Association. The article is authored by John Monteith who is in charge of the Arlington turf garden. Space will not permit quoting him fully, but a few of his statements applicable to soil acidity and liming follow:

"Although the finer turf grasses undoubtedly thrive in an acid soil, it now appears that excessive acidity cannot be tolerated. These grasses may thrive in an extremely acid soil during certain seasons, but during the hot, dry, summer months on such soil they are likely to be injured by brown patch and scald.

"On the acid soil at the Arlington turf garden lime was found to increase the vigor of bent turf and greatly reduce the amount and severity of . . . brown patch as well as scald.

"There has apparently been a tendency to overestimate the value of the acid reaction of soil brought about by sulphate of ammonia. . . . Many of the benefits attributed to acidity have been observed on greens where sulphate of ammonia has been used repeatedly but where tests reveal that the soil actually was almost neutral."

In Bulletin No. 76, "Better Lawns," published by New Jersey Agricultural Experiment Station, we read, "Most soils which have not been limed for a period of years have become acid. Recent experiments have shown that soil acidity is not a satisfactory cure for weeds; also that lawn grasses, particularly Kentucky blue grass and clover, will make more satisfactory growth on soils in which acidity has been largely corrected. If the soil is known to be acid . . . an application of lime at the rate of 50 to 100 pounds per 1000 square feet may well be given."

Also, in the U. S. Department of Agriculture Bulletin No. 1677, "Planting and Care of Lawns," the authors review the fact that some years ago it was common to make a heavy annual lime application. Then the pendulum swung to the opposite extreme. They continue by saying, "Further investigations indicate . . . that, everything considered, a course midway between these two extremes is safest and that a soil about neutral in reaction is likely to give the best results. Where soil is known to be acid, or sour, lime should be worked into it before the seed is sown."

The most recent thought on the matter of controlling weeds is to keep the grass growing so thriftily that it will keep the weeds from gaining a foothold. This involves several things. First, the lawn should be started on good, fertile, loamy topsoil. Second, where the climate permits the seed should be sown (liberally) in the late summer or early fall, thereby permitting the grass seedlings to become well established by spring before the weed seeds germinate. Third, fertilize regularly, and fourth, apply lime when and as needed in order to correct acidity and promote a better and more balanced growing condition.

It is unfortunate that, in the minds of some, lime and fertilizers are considered to be competitive when in reality these two materials are helpmates. Much of the propaganda in favor of fertilizers and against lime comes from those who cannot seem to realize that each of these materials performs different but definitely important duties in the soil.

It is the primary job of fertilizers to supply plant food—to feed the grass—while lime corrects soil acidity, encourages the activity of certain beneficial bacteria, supplies calcium and magnesium as plant food and by doing these things makes fertilizers, compost, etc. more efficient.

In conclusion, and in view of the foregoing facts, it may be logically suggested that anyone, about to make a new lawn or having difficulty with an old one, would do well to inquire into the lime need of the soil.

Two Close Calls

Late last summer while spotting deer crossings in the Allegheny National Forest near Saybrook, Pennsylvania, my brother and I saw a frog dart pell-mell across the road closely followed by an ordinary green garter snake about eighteen inches long. Their appearance was so surprising that we followed to see the finish. It was with some difficulty that we kept the pair in sight because of the brush and the speed at which the frog was trying to esc

The snake seemed to be following frog by sight and was definitely gaining its prey. The frog was literally "wild-e with fear." It did not dodge or try to h but merely to rush down the hill as as its hops could take it. The frog su would have been caught but fortunatel large log lay across its path. The f cleared the log with one leap while snake had some difficulty in getting o In the meantime the frog continued dc the hill followed by my brother.

I watched the snake finally succeed getting over the log. Then it began to h It explored the entire vicinity on both si of the log, ranging about ten yards on e side. The frog, much fatigued, stopped s distance away to rest. What happened th after is unrecorded because in about minutes we left them.

About a week later, in another sect we heard a strange squeaking in the g under a big maple tree. Upon investigat we found a garter snake about fifteen inc long holding a frog by the hind legs. frog, about four inches long and two inc broad, was being slowly swallowed des its struggles to escape. It was held fir by the snake's distended jaws. In ab eight minutes the frog disappeared altho we could still notice its occasional strug within the snake's body.

After about five more minutes and in interest of science, we killed the snake, it in two in front of the frog and sh the frog out. It seemed to gasp slightly; then sat quite still. We kept it in a box several days and it seemed to be none worse for its experience.

GLEN E. CARLSO

Credit the Downy and Bobwhite

In an Ohio cornfield adjacent to a la tract of woodland the owner, Eug Brundage, found downy woodpeckers fly from stalk to stalk inspecting all sides, and down, then flying quickly to anot infected stalk. The birds worked separa and in many parts of the field. They w observed searching for corn borers every that the men went to the field to husk c In many sections of the corn belt the c is menaced by the recently introduced Eu pean corn borer more than by any ot insect. If the downy woodpeckers take destroying the borer wherever it has gai a foothold, they may render a service to corn grower as great as the service wh bobwhites render to potato growers.

Where bobwhites are cared for in w ter, and are protected by law from hun throughout the whole year, these birds h become so numerous and so tame that spraying of potato vines with poison to beetles is not necessary, because nearly of these insects are eaten by bobwhites. claims made by sportsmen that coveys bobwhites need to be broken up to prev inbreeding and consequent deterioration had no scientific basis and recently has b disproved by measurements and weighi of Ohio birds and comparing them w birds in states of the same latitude wh permit the shooting of quail.

Professor Edwin L. Moseley, who lear of Mr. Brundage's observations on downy woodpeckers searching for c borers, has since found several other p sons who have seen these woodpeckers p forming this useful service to the farm

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EDITOR, NATURE MAGAZINE
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THANKS TO THE TELESCOPE

(Continued from page 138)

ways keeps the same face turned toward the sun in the same manner that the moon always keeps the same face turned toward the earth in its revolution around the earth. To most observers Venus shows no surface marking but appears to be enveloped in a dense atmospheric veil that is permanent and impenetrable. There are a few observers who claim to have observed surface markings on Venus but these have not been confirmed and even the spectroscope fails here because the velocity of rotation is too small to measure.

The telescope has done much for us in the case of the three planets, Mars, Jupiter, and Saturn. The naked-eye observer sees them as three bright star-like objects. The telescope transforms Saturn into a marvellous ringed world, unique in the solar system and possibly in the entire heavens. It shows Jupiter as a mighty ruler of a large family of satellites and with a surface that at times undergoes truly sensational changes, such, for example, as the appearance of the Great Red Spot in 1878, a semi-permanent marking that may have existed for centuries but which undergoes remarkable changes in color and general appearance. Its ever-changing belts and spots, infinite variety of detail, and rich colors make this planet the most fascinating of all the planets to observe, although Mars is a close rival in popular interest because of its "canals" and polar caps which change seasonally as do many of its surface features. Mars and Venus are the two worlds that we have some reason to feel may be inhabited. The surface of Venus is hidden permanently under its veil of clouds, but that of Mars shows a wealth of detail and seasonal change. The inclination of its axis is such that its seasons are very similar to our own though about twice as long and its day is only slightly longer than our own. Yet its atmosphere is very rare and only a trace of oxygen has been discovered in it, all of which adds to the problem of the possibilities of Mars as an abode of life.

Mars is in opposition to the sun on March 1 and nearest to the earth for this return to opposition on March 3. It is in Leo and can be distinguished from Jupiter, which is also in Leo this month, by its ruddy color and also by the fact that it is less brilliant than Jupiter. Jupiter comes into opposition with the sun on March 9. Both planets are now in their best positions for observation and on their dates of opposition are visible from sunset to sunrise. Saturn is now low in the southeast at sunrise and not well placed for observation.

Mercury is always seen to the best advantage at the eastern elongations that occur in the spring because the ecliptic, near which it lies, then rises most sharply from the western horizon. Mercury will be at eastern elongation on March 6 and may be seen for a few days before and after that date about fifteen degrees above the western horizon at sunset. Venus is too close to the sun for observation this month. On March 20 at 8:43 P. M., E.S.T., the sun will cross the equator coming north and spring will begin in the northern hemisphere.

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Nature Club

We hope that every Nature lover living within close proximity to Webster Groves, Missouri, is a member of the Webster Groves Nature-Study Society. Receipt of the last issue of the Nature Notes Bulletin of that active group stimulates us to the expression of this hope because of the interesting activities planned by the Society. If there are Nature lovers not acquainted with the organization, they should get in touch with the president, Dr. E. P. Meiners, Webster Groves, Mo.

Watch As Compass

An improvement on the woodsman's method of telling directions by a watch has been discovered by a United States Forest Ranger in Idaho. If you point the hour hand of the watch at the sun then half way between the hour hand and twelve o'clock on the dial will be due south. Many persons who frequent the open spaces know this and can navigate so long as there is sunshine. It remained for the ranger to discover that even on a cloudy day the sun will cast a faint shadow if the tip of a knife blade or a pen point is set upright on the thumb nail. The sun may be invisible through the clouds but there is always a little more light, even though you cannot distinguish it, coming through the clouds in front of the sun. Just as soon as you can get this shadow you can point the hour hand at the place where the sun is and get your bearings.

New Habitat Group

One of the largest—if not the largest—museum habitat groups has been completed and placed on exhibition in the Field Museum of Natural History in Chicago. This group depicts twenty-three different mammals and a number of birds gathered at a typical water hole in the African wilds. This tremendous group stretches the entire width of Carl E. Akeley Memorial Hall, appropriately, since Mr. Akeley's achievements as a photographer of wild life in Africa made his name synonymous with what is best in animal study and preservation in that country.

Snooty "Snoody"

J. H. Vosburgh, Delaware and Hudson locomotive engineer, of Mechanicville, New York, is the proud owner of Snoodles, a Scotch terrier who dotes on automobile rides —that is, if the car has "class", otherwise, he prefers to walk. Vosburgh's home is at the edge of town some distance off the main highway. There's a lane leading from the house to the road. Snoodles has been taught not to wander farther away from home than the end of the lane. Each evening he meets his master there for his ride back to the house.

The only car owned by the Vosburgh family until recently was one of the higher priced makes, but a short time ago a cheap second hand car was purchased for general utility purposes. The first time Vosburgh drove home in it "Snoody" met him as usual, but when he discovered the car was not the one to which he was accustomed he refused to get into it. Coaxing and petting did not change his decision and he walked back to the house alone. Since then, when he finds the family is using the cheap car

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alks home from the road, but when arrive in what he evidently considers r style he rides with them. Vosburgh s perhaps "Snoody's" ancestors be- d to one of the F.F.V.—J. C. CARLISLE

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e Editor,
re Magazine:

't there some way of abolishing that c nuisance, which appears annually? I to the brave (?) hunter or gunner. e is not in evidence in the cities, except prototype, the "gun man" and bandit, n the country and small towns he is a erous nuisance.

he only remedy for the pest that I can est is to entirely abolish the open hunt- season, which is a relic of barbarism, n man had to hunt for a living, and it t to have been abolished long ago in enlightened, twentieth century.

man applies to the State for a hunting se, for which he pays a small sum of ey. Although he may be entirely inex- nced in the use of dangerous firearms, as to pass no examination, in order to his license. He seems to go on the sup- ion that his license to carry a gun carries a license to tramp all over the erty-owners' fields and forests and shoot kind of a bird or animal that appears ght.

his sight every bird is a game-bird a lawful victim of his recklessness, pro- d by a State license. Query:—has the any right to license such a dangerous ance to the property-owner?

s a result of the open hunting season, e birds are becoming very rare in many ons, and will soon be as extinct as the o, if this wholesale shooting isn't ped soon. In many walks which I have n, in the woods and fields, during the summer and autumn, I have seen but partridge, one pheasant, one woodcock, no quail. Many song-birds as well as e-birds also fall victims to the noisome ance of the gunner.

rom an economic point of view the ment is still stronger against the gunner. are annually spending many millions Dollars in trying to subdue an ever-in- sing horde of destructive insects. The ls, both song-birds and game-birds, are e of our best friends, helping us to sub- these same insect pests.

The gunner shoots and kills many birds animals and injures multitudes of others, ing them to suffer and die.

He is a trespasser on private property, s down your "no trespass" signs, and he property-owner protests he is insulted. When it is possible, the wily gunner nts near a bird reservation, because there birds are tamer and thousands of unded birds come back to the reserva- ns to suffer and die.

Why license an army of over six million n and boys annually, to go out and shoot se same good friends of ours, the birds, t for "the fun of the thing"?

The fees received by the State for hunting enses wouldn't go very far toward paying debt which we owe our good friends, birds, for their work in the destruction insects. Let us have a new law or refer- dum on the open hunting season, and olish it entirely, as a cruel relic of barbar- n, an economic waste, and a blot on our called Christian Civilization.

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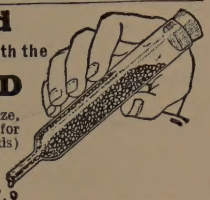

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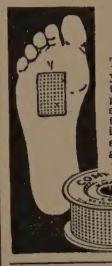

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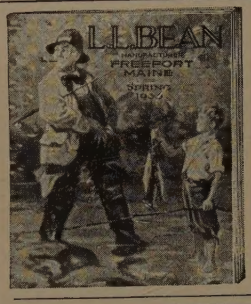

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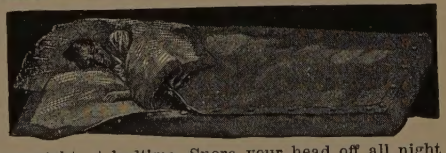

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RIGHTEOUS WRATH
BY ELEANOR WHERRIT

It was a lovely October afternoon. The Doctor and I were out in the garden admiring the fall-blooming crocuses, potting plants, raking leaves, and enjoying his half-holiday to the fullest degree, when all of a sudden our neighbor's red squirrel started the most awful scolding we had ever heard! He had built his nest high up in a partially rotted tree and for days we had been watching him carrying his winter food supply to the nest. Now he came down the tree trunk in a rage, leaped over the fence and flew across the garden to the rockery where our two chipmunks have one of their winter storage plants. Perched on the highest point of the rockery, he surveyed the surrounding garden until he located the chipmunks under the hedge of four o'clocks. Then, with an agility and grace that was beautiful to see, he made a spring into the air and landed almost beside the chipmunks. Startled, the chipmunks scampered in opposite directions, the squirrel after them as fast as he could go. Round and round the garden they went, under the plants, through the leaves on the ground, over the rockery, everywhere. When one chipmunk got tired, the other one came out from hiding to lead the chase. All the time they seemed unmindful of us, sitting there watching them. When the squirrel got tired, he would go to his nest in the tree and rest, then, in a few minutes, down he came again with renewed energy and passion to take up the chase. This went on all afternoon.

We wondered why he was so intent upon harming our chipmunks, for he was really angry and would have bitten viciously had he caught one.

"I think I know the reason for his wrath," said the Doctor. "Remember I wondered where the chipmunks got the acorns we saw them storing away yesterday? They must have stolen them from the squirrel and he just discovered the theft. We have no acorn trees near us and the squirrel has no doubt been carrying them a great distance and now they are gone. I don't blame him for being angry.

"I am glad," he added thoughtfully, as we walked toward the house, "that that little red rascal doesn't grow as large as our neighbor's police dog. With the temper he has, he'd be a formidable enemy."

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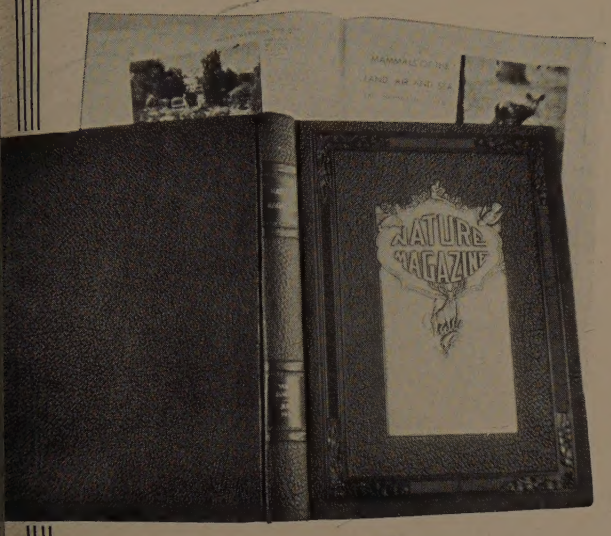

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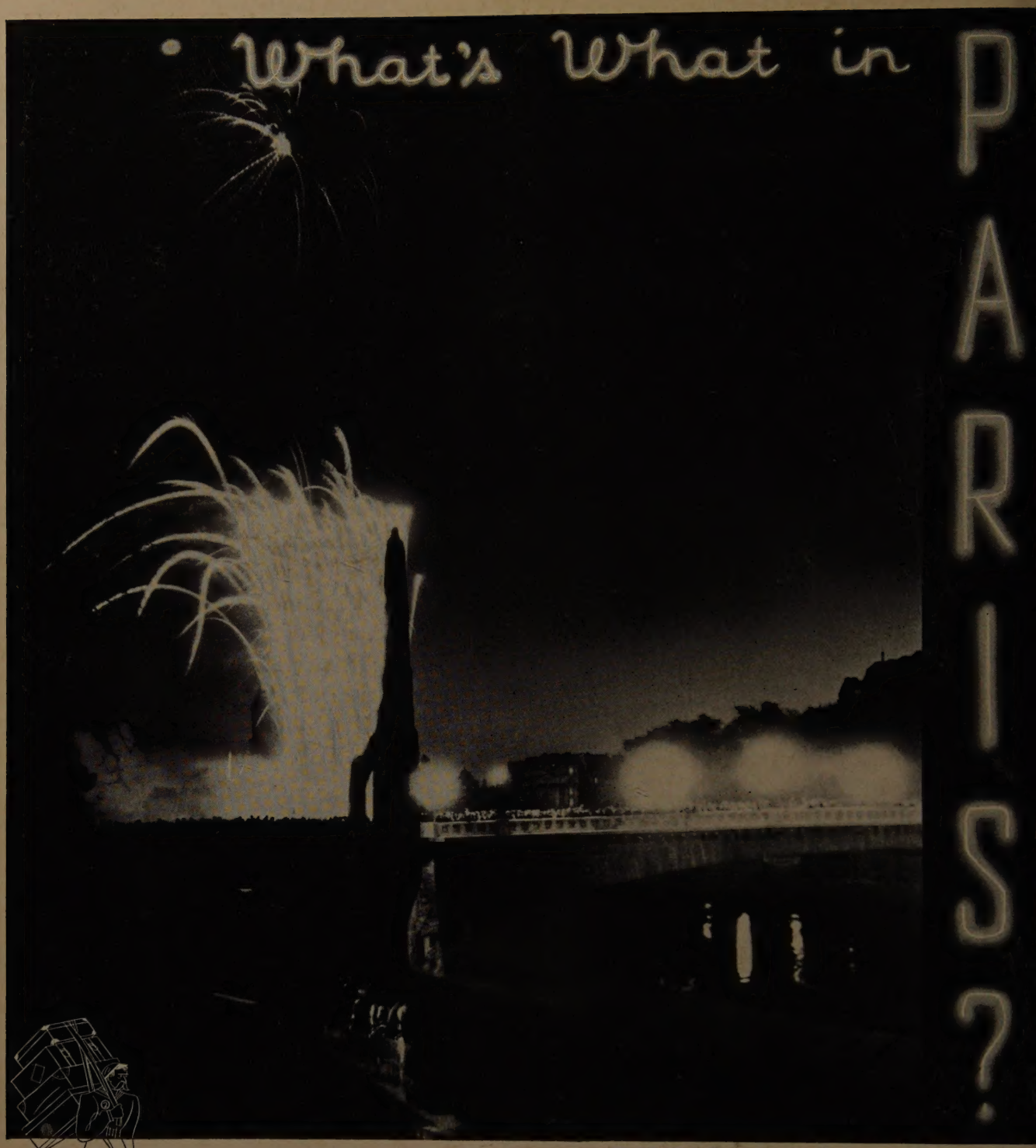

Bastille-Day fireworks, from le Ponte de la Tournelle, Pa

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